THE IRON AGE

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The Pacific Coast Steel Company's Plant

Open Hearth Furnaces and Rolling Mills for Turning Out Rails, Structural Material and Round, Square and Corrugated Bars, Tie Plates, Etc.

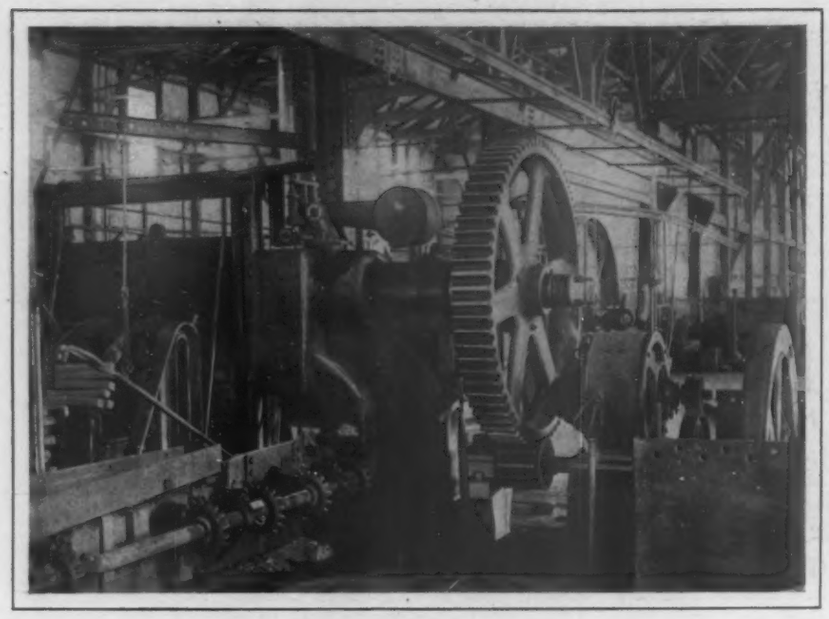
The Pacific Coast Steel Company began operating January 2, this year, an interesting steel plant comprising modern open-hearth furnaces and rolling mills for producing angles, channels, I-beams, Z-bars, tie-plates, splice-bars, rails, flats, rounds and squares, corrugated bars, etc. The plant is located at South San Francisco, nine miles from the city of San Francisco, and has both water and rail facilities which, it is felt, are destined to make the plant one of the conspicuous industries of the northern part of San Mateo County. This locality, on account of rapid railroad development, is bringing the industrial center of San Francisco so far southward that there is a movement now under way to join this part of San Mateo County with San Francisco County. The company's main offices are located in the Sheldon building, San Francisco.

The successful establishment of the plant of the Pacific Coast Steel Company is credited largely to David P. Doak. Among those who have assisted him in the work were: James H. Swindell, Pittsburgh, who with twenty-five years' experience to call on designed and built the two 30-ton basic open-hearth furnaces now installed; Frank Wackermann, chief engineer, who was for a number of years connected with the Jones & Laughlin Steel Company and the Lewis Foundry & Machine Company, Pittsburgh; James Early, in charge of the open-hearth department; W. E. Reeble, roll designer, and N. V. F. Wilson,

Charging Side of No. 1 Open-Hearth Furnace. The 18-In. Rolling Mill

Pouring Side of No. 1 Furnace Hydraulic Charger to Heating Furnace

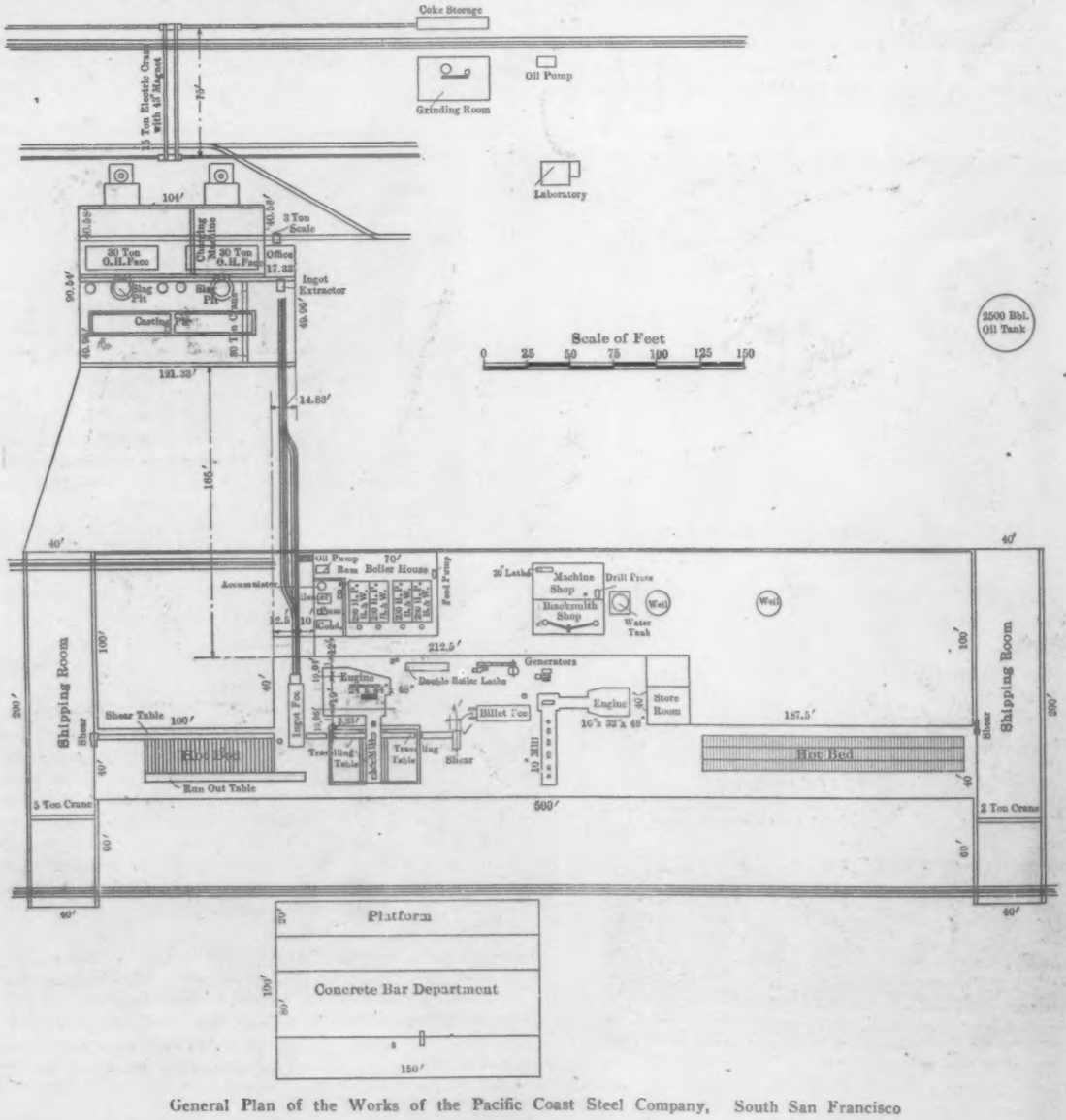
VIEWS IN MILL OF THE PACIFIC COAST STEEL COMPANY



Billet Shear and Furnace Charger for 10-In. Mill

general superintendent, who has been in the steel business for some twenty-five years, with such plants as those of the Portsmouth Steel Company, Portsmouth, Ohio, and the Colonial Steel Company, Pittsburgh.

Ground was broken for the plant in August, 1910, and it was completed and in operation, as stated, January 2, 1912. In addition to the two furnaces now installed, having a capacity of approximately 3000 tons per month, the company intends adding two more furnaces the coming year, and the plant generally has been built with the idea of increasing capacity from time to time as business justifies. The accompanying plan indicates the general relation of the buildings and their size. The open-hearth furnace building is 92 x 122 ft. in size and is of modern steel construction. The rolling mill building is 80 x 580 ft. and has a shipping room at each end 40 x 200 ft. in plan. The boiler house is located centrally, 50 x 75 ft. in plan, and has four 280-hp. Babcock & Wilcox boilers, and there is also located in the boiler room the hydraulic accumulator used in connection with hydraulic heating furnace charging apparatus, the oil system required in connection with the furnaces, which are oil fired, and the condensing plant for the rolling mill and electric generating engines, which are both operated condensing. There is also a warehouse



General Plan of the Works of the Pacific Coast Steel Company, South San Francisco

for corrugated bars with an 80 x 150-ft. floor space, and the Southern Pacific tracks enter all shipping rooms and warehouses. The laboratory is next to the open-hearth furnaces and the blacksmith and machine shops are located near the boiler room. Climatic conditions are regarded as ideal, allowing for working every day in the year with comfort.

Raw material for the open-hearth furnaces is unloaded by a 15-ton 75-ft. span electric-traveling crane, with a 43-in. magnet, which has unloaded as much as 300 tons in ten hours. The material is put into the open-hearth furnaces by charging machines in the usual way. The steel after being tapped off into the ladle is handled by a 40-ton electric ladle crane and poured into bottom-cast ingot molds. The ingots are stripped at the point indicated in the plan and taken to the rolling mill by gravity cars, where they are charged into a Swindell continuous re-heating furnace. The charging is done by a hydraulic ingot pusher. The furnace has a capacity of one ingot per minute, and the ingots going into this furnace are dropped off the skid pipes to a 6-ft. hearth and rolled to the front of the furnace.

The rolling mills consist of one 18-in. three-high structural mill with 72-in. roughing rolls, 72-in. strands and 36-in. finishing rolls, and one 10-in. three-high five-stand guide mill. The 18-in. mill is served by two electric tilting traveling tables taking the ingots from the furnaces. It is designed to roll angles, channels, I-beams, Z-bars, flats tie-plates, splice bars, rails rounds and squares and also billets for the 10-in. mill. It has an 80 x 24-ft. automatic hot-bed, and hot-saw, shear table and a special combination tie-plate punch and shear, arranged also to shear angles and shapes.

The billets for the 10-in. mill are cut to suitable lengths on a 4-in. hot-billet shear and delivered to and charged by a hydraulic pusher into a Swindell continuous recuperative billet furnace having a capacity of four billets per minute. The 10-in. mill is designed to roll angles, flats, rounds, squares, corrugated bars, and has a capacity of 50 tons in ten hours. The hot-beds are 175 ft. long and are served by conveyors from the mill and by a 150-ft. live roller shear table.

Further conferences have been had at Washington between representatives of the United Shoe Machinery Company and the Department of Justice for a settlement of both the civil and criminal anti-trust suits brought against that company. A decree of dissolution has been under consideration. In the civil suit pending in the United States District Court of Massachusetts the question now up is whether the evidence shall be taken by an examiner publicly or privately.

Electric Magnet and Crane for Handling Raw Material

Heating Furnace and the 10-In. Mill

Lackawanna Steel Company Statement

The Lackawanna Steel Company's report for the three months ending June 30, 1912, shows total income of $888,426. The deductions are: For interest on bonds and notes, $437,487; for sinking fund and exhaustion of minerals, $72,271; for depreciation, etc., $293,122. The surplus is thus $85,546, which compares with a surplus of $71,843 in the corresponding three months of 1911. In the first three months of 1912 the company had a deficit of $450,772. The net deficit for the six months is therefore $365,226, as against a surplus of $107,573 for the first six months of 1911. The total income in the first half of 1912 was $1,200,831, as against $1,606,360 in the first half of 1911. The unfilled orders on June 30, 1912, were 564,990 gross tons, against 218,391 tons on June 30, 1911.

The Patent Monopoly Question.—Washington advices are that the Department of Justice is preparing to have the full bench of the Supreme Court of the United States pass on the "patent monopoly" question. The issue will be reopened through the anti-trust suit against the so-called bathtub trust. This has been appealed to the Supreme Court by the defendants, who were ordered to dissolve the trust by the United States Circuit Court for the District of Maryland. The Supreme Court, with seven members sitting, decided last spring, four to three, that the owner of a patented article might restrict its use and stipulate the use of certain appurtenances. The decision affected several pending trust cases and a great number of monopoly investigations under way. The effort to have a full bench pass on the question will precede any attempt to restrict patent monopoly by new legislation.

Five narrow gauge motor cars are to be built by the McKeen Motor Car Company, Omaha, Neb., for delivery in Brisbane, Australia, by January 1, 1913. These represent a second order for internal-combustion, self-propelling cars received through the Australian government, and it is understood that they are similar to those built for use in the United States, with the exception that the front and rear ends are equipped with English standard style of spring buffers. The car bodies are to be of the McKeen wedge-shape, with round roof construction and round dustproof windows. The 200-hp. engines will be equipped with the McKeen carburetor.

The Journal of the Franklin Institute is to extend its field as a general scientific magazine. Heretofore the editorial work has been in charge of the Institute's Committee on Publication. The plan now is to have a staff of eighteen associate editors, well known in science and in engineering, who will co-operate with Secretary R. B. Owens in bringing out the journal.

Mannesmann Seamless Steel Joint Tubes

Earlier and Later Methods Employed in Their Production—Construction and Efficiency of the Coupling Head

A paper read by Fritz Seel before a meeting of the track superintendents' society of the railroads in the Cassel district, Germany, gave an interesting résumé of the method of manufacturing the Mannesmann seamless tubes

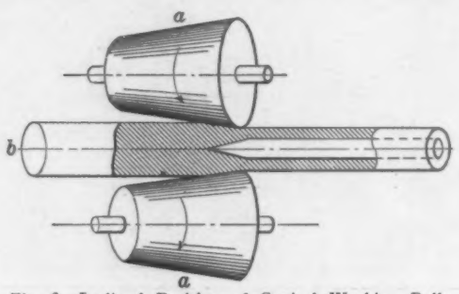


Fig. 1—Inclined Position of Conical Working Rolls

and the development of the process of forming the tube joint. The following synopsis is from the text of the paper as given in the Wochenschrift für Deutsche Bahnmeister:

In 1885 reports were first published, the paper says, that the brothers Mannesmann had succeeded in making tubes or hollow cylinders from solid ingots simply by a rolling process and without the use of a mandrel. This was done in their father's mills at Remscheid, and this invention later popularly known as the "inclined roll process" created the greatest sensation throughout the world. Under the leadership of the Deutsche Bank in Berlin a company was formed with a capital of 35,000,000 marks for the carrying out of the process. It cost an immense amount of work and money to overcome the obstacles to its practical operation. Later developments are detailed in the paper, from which the following is taken:

A thoroughgoing change in the method of manufacture was brought about in 1891 by the invention of the so-called "pilgrim rolling mill," by Max Mannesmann. Since the introduction of this second method of working, which has nothing in common with the "inclined roll process," these

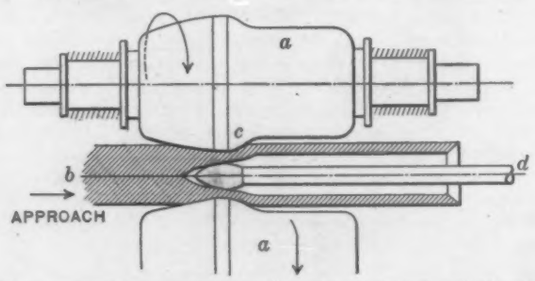


Fig. 2—Arrangement of Rolls and Position of Steel and Mandrel

two main processes of the Mannesmann tube mills have to be thought of separately.

In the inclined roll process a solid cylindrical ingot is rolled while hot in such a way that a thick walled rough tube is produced. Fig. 1 shows the inclined position of the conical working rolls and Fig. 2 the real shape and arrangement of the working rolls, the ingot, the guide rolls and the mandrel. For clearness the slightly inclined position of the working rolls is not shown. The process is as follows: The two inclined partly conical working rolls, *a*, turning in the same direction press the hot and therefore soft piece *b* forward. At the same time it is turned in such a manner that the single points on its surface describe spirals, the distance between which depends on the amount of incline of the rolls. At the narrowest opening, about at *c*, the outside is pressed forward more than the rest, especially the parts immediately in contact with the rolls. In this way, as the working rolls come to a conical end near the front, a brake effect will at the same time be brought to bear on the piece, whereby, the outer parts being pressed forward, a crater-like hole in the end of the round ingot is produced which if proceeding further will pierce the ingot without the help of the mandrel.

To facilitate this process, however, a pointed mandrel *d* is fixed firm and unturnable between the working rolls, and over this the rolled piece must move. This considerably, accelerates the rolling process and guarantees an equal thickness of wall with a smooth interior. By this process a semi-finished rough tube, short but of great thickness of wall is produced.

The further working up of the tube takes place in the "pilgrim rolling mill" shown in Fig. 3, in which the hot, short, thick-walled middle product is rolled into a long thin-walled tube. The name "pilgrim" (German, "pilger") is used because of the step by step action of the rolls. Contrary to the ordinary rolling process the rolls, *a*, do not draw the piece through, with lessening in the section, but turn in the opposite direction to the hot piece drawn through them, which carries throughout its whole length a cylindrical mandrel, *d*. The rolls make up to several hundred revolutions a minute, depending on the diameter of

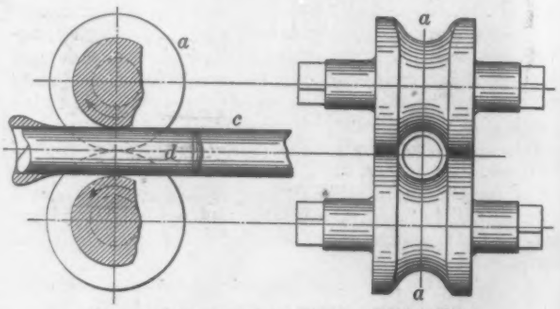


Fig. 3—Arrangement of Pilgrim Rolling Mill

the tubes, and the piece with its interior mandrel is turned each time in order to produce a uniform rounding of the finished product. By special arrangement, at every revolution of the rolls the mandrel with its half finished product may be uniformly pushed forward, and each time only a small part is brought to the required finished thin dimensions and is pressed forward over the corresponding part of the mandrel.

If the rolling process is interrupted there is found at the place rolled last a gradual approximately conical transition from the great thickness of the walls of the middle product to the thin-walled finished material. By suitable mechanical arrangements it is possible to make this conical transition, toward the end of the rolling, still more uniform and gradual in order to make it suitable for the joint.

The finished rolled tube while still warm is pulled off the mandrel. When cold both ends are cut for the manufacture of the joints, but in such a way that the larger conical end is left on for the future coupling head. It is then heated and the enlarged end is expanded by suitable

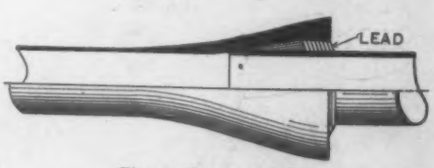


Fig. 4—Shape of Joint

mechanical means to the desired form. Through the varied heating and contraction of the material the coupling head is always a little tighter on the outside end than in the middle; that means it is somewhat conical on the inside. The shape of such a joint is shown in Fig. 4. This conical

shape can easily be enlarged, and tubes with such joints for a working pressure above 20 atmospheres have often been supplied. They have been exposed in the company's shops to testing pressures up to 130 atmospheres without showing any leakage.

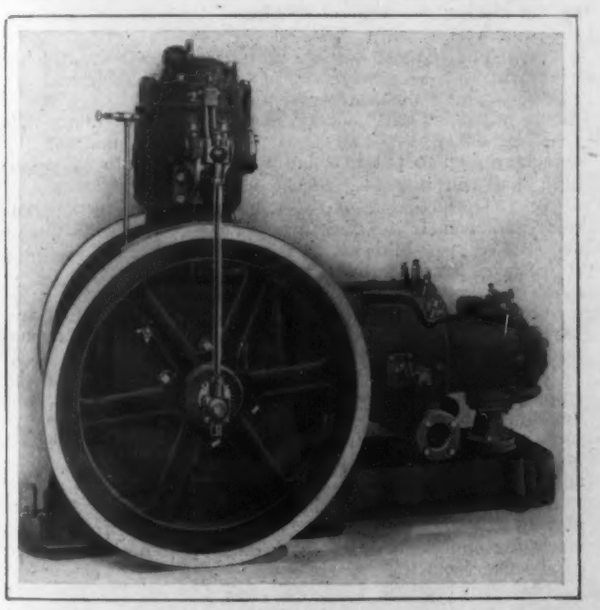
These joint tubes are produced by the Mannesmann tube works in the greatest possible lengths. For instance, the dimensions may be 80 mm (3.15 in.) inside diameter and above, and the average length, 8 to 12 meters, with a maximum of 15 meters (49 ft. 2 in.). The ordinary dimensions are 40 to 275 mm inside diameter (1.57 in. to 10.83 in.). Tubes below this in diameter can be furnished but do not give much advantage for they are not much cheaper than the 40-mm tubes. In place of such small joint tubes ordinary seamless tubes are more suitable, the ends being threaded and a collar used. Such tubes are also produced at the Mannesmann mills down to ⅛ in. diameter.

After the joint tube is finished it is often coated with asphalt and jute to protect it from outside influences, especially against rusting. The paper treats in detail of the many ways in which such joints tubes can be used.

G. B. W.

A New Steam-Driven Air Compressor

An air compressor in which the steam cylinder is located vertically above the center of rotation and the air cylinder is horizontal, making a self-contained unit of un-



New Compressor Built by the Pennsylvania Pneumatic Company, Erie, Pa.

usual proportions, has been brought out by the Pennsylvania Pneumatic Company, Erie, Pa. It represents one of the line of air compressing machines built from the designs of H. Edsil Barr, vice-president and mechanical engineer of the company. The accompanying reproduction of the photograph shows the single steam-driven compressor giving a view of the steam valve gear, the air valve gear and the drive of the steam governor being located on the opposite side. It is stated that the relation of the steam and air cylinders effects a reduction of 40 per cent. in space and foundation as compared with tandem compressors or with horizontal types of the same capacity. It is also mentioned that the relative positions of the cylinders provide that the period of highest power in the steam cylinder occurs when air resistance is highest.

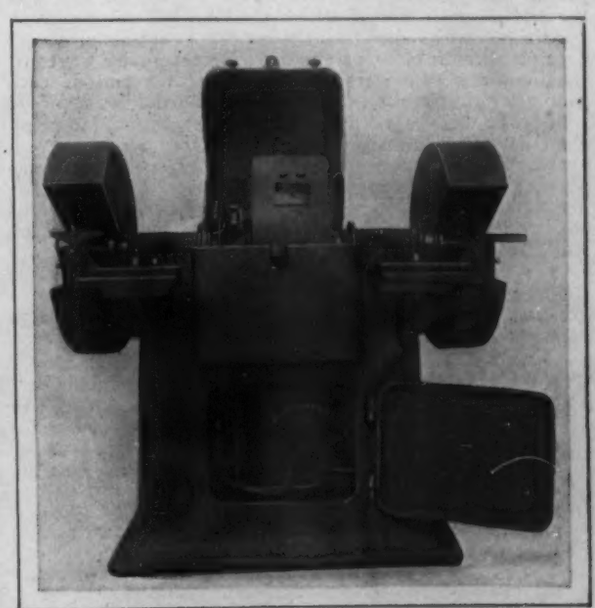
The steam and air cylinders are single acting, each with a one-piece trunk piston engaging the crank end through a connecting rod. There is thus an elimination of piston rods, stuffing boxes, packing, cross-heads and the like, tending to minimize friction loss and increasing accessibility of the different working parts. An unusually interesting feature is that the air cylinder combines both a high and low-pressure bore and compresses in two stages, securing the Barr unit compound in machines of relatively small sizes. It is emphasized that the unit compound being two stage is capable of housing ample port areas without appreciably affecting the volume of air discharged. It has also an intercooler between stages. The Barr design is also built for direct connection to the gas engine or the gasoline or kerosene motor or the waterwheel or steam turbine and the line of compressors, which are also built for vacuum service, includes those driven by steam and electric motor, as well as by the internal combustion engines. In capacity they range from 150 cu. ft. of free air per minute upward for pressures of 70 to 150 lb. per square inch. It will be inexpedient at this time to touch on some of the interesting detail features like the steam valves, the lubrication and the general argument for the Barr design.

Motor-Driven Dry Grinding Machine

The Springfield Mfg. Company, Bridgeport, Conn., has recently brought out a motor-driven direct-current grinding machine which it has designed and adopted as its standard for direct-current work.

In designing the machine it has been the aim of the builder to use as far as possible standard motors, the only thing that is special as far as the motor is concerned being the shaft. It will be noticed that the motor is mounted on a very rigid and substantial base and the whole is inclosed in a dust tight case, the upper half of which is mounted on hinges and is easily thrown back as shown for inspection, adjustment and cleaning. A single bolt holds both parts together when the case is closed down.

The case is bored out so as to fit the finished projections shown on each of the journal boxes and as the joint of the casing is ground, it is pointed out that a case which is as near dustproof as it is possible to make one has been secured. The machine is also designed to take two hoods which are made so as to practically inclose the whole wheel with the exception of a portion which must be left open in front. The hoods are made with an outer plate which can be readily removed when it is desired to change wheels. If an exhaust system is available the hoods can be connected to it. A special slab inside of the base supports the controlling and starting apparatus which is brought as close to the front as possible for con-



A New Direct-Connected Motor-Driven Grinding Machine Built by the Springfield Mfg. Company, Bridgeport, Conn.

venience in operating. The bearings which are of the self-oiling type are made of very generous proportions.

Three sizes of machine are built at the present time, for accommodating wheels 12 in. in diameter with a 2-in. face, 18 in. in diameter with a 2 or a 3-in. face and 24-in. wheels with faces either 3 or 4 in. wide.

The Rockwell Furnace Company, 26 Cortlandt street, New York, has just closed a contract with the Crucible Steel Company of America, Pittsburgh, for the installation of three of its large overfired car type furnaces for the heat treatment of special steels. Natural gas will be used as fuel.

Profit Sharing in a Wisconsin Plant

Features of the Stock Distribution Plan Followed by the Baker Manufacturing Company, Evansville, Wis.

We have received from the Baker Mfg. Company, manufacturing farm machinery, gasoline engines, etc., Evansville, Wis., a copy of the amendment to its by-laws covering a scheme of profit sharing which it has had in operation for the past 12 years. The company states that it has been more liberal than was suggested in the first paragraph of the editorial on "Profit Sharing," published on page 1521 in *The Iron Age* of June 20, the proportion going to capital being to the wages in this case as 5 per cent. dividends on preferred stock are to the wages of those entitled to profit sharing; that is, the company has been giving about 20 times as much as the plan mentioned in the editorial.

The company further states that it is not only making an effort to get its stock among its employees, but is also trying to provide for the stock not drifting out of their hands by inheritance or by their quitting the employ of the company; this is done by buying it in. The purchase of stock, of course, reduces the size of the company's capitalization, and it would not attempt to bind itself to purchase all stock that might be offered, but it is providing a stock-purchasing fund which ultimately will be increased annually by one-twentieth of its capitalization. The partial wages paid by the company are competitive wages. The amendment from the by-laws covering the scheme is as follows:

(1) **Resolved,** That the preferred stock be paid a 5 per cent. annual dividend quarterly in advance on the first day of January, April, July and October, the same to be taken from the sinking fund.

(2) That the employees in the factory proper be paid partial wages weekly, and office employees partial wages at the end of each month, which shall be full compensation for their services until they are entitled to remaining wages (see paragraphs 9, 20, 21 and 22); the remaining wages of the honorary employees to be fixed at the end of each year after the results of the year are known.

(3) To determine the remaining wages an inventory shall be taken January 1 of each year of all assets, excluding accrued interest, and all liabilities, including stock-purchasing fund (see paragraphs 7, 10, 11, 12, 32 and 34) and sinking fund (see paragraph 8) and the face value of stock outstanding without deducting the indorsements on stock on deposit.

(4) In case the liabilities exceed the assets, the loss shall be drawn from the sinking fund; but if the assets are greater than the liabilities the excess shall be used as follows:

(5) 1. To replace the amounts taken from the sinking fund during the year for preferred stock dividends (see paragraph 1).

(6) 2. To pay a 5 per cent. annual dividend on common stock; the same to be paid quarterly on the first day of March, June, September and December.

(7) 3. To pay into a stock-purchasing fund $5 for every share of stock on deposit with the company January 1, subject to the purchasing contract. (See paragraph 26.)

(8) 4. Ten per cent. of the amount yet remaining shall be added to the sinking fund. Nothing shall be drawn from the sinking fund except to pay preferred stock dividends and losses in a year's business.

(9) 5. The other 90 per cent. shall be paid to the preferred stockholders as an extra dividend, and to the honorary employees of the company December 31 (see paragraphs 20, 21 and 22) as remaining wages; the amounts going to the several individuals to be proportional to their 5 per cent. dividend on their preferred stock and their wages as honorary employees at their partial hourly wage rates. Nine-tenths of the total amount paid as extra preferred dividend and remaining wages shall be paid in common stock figured at par as soon as possible after the inventory is completed and the other one-tenth shall be paid in cash on December 1 (see paragraph 24).

(10) In no year shall the amount paid in extra preferred dividends and in remaining wages exceed the partial hourly wages and the regular 5 per cent. preferred dividends. If the amount to be paid should be greater, the excess shall be added to the stock-purchasing fund.

(11) The stock-purchasing fund shall be increased by the amount each purchase of stock by the company is less than par.

(12) The stock-purchasing fund in excess of five times the last annual indorsement on retired employees' stock (see paragraph 32) may be used to purchase stock on deposit. (See paragraph 34.)

(13) The stock-purchasing fund shall not be used for other purposes than described in paragraphs 12, 32 and 34.

(14). No stock certificates shall be issued for less than $100. The fractional amounts due in stock, which cannot be issued in full shares, shall be known as stubs and combine into whole shares and sold at the annual meeting to the employees, owners of preferred stock and the company.

(15) The number of shares so sold shall be the sum of the stubs divided by 100, less the decimal.

(16) Each bid shall be in writing and give the name of the bidder; the number of shares he will purchase and the price he will pay per share.

(17) The highest bidder shall be awarded the number of shares he has bid for; the next highest bidder his, and so on, until all the shares are disposed of. Should there not be sufficient bids to take all the stock, then more bids shall be asked for and the directors may instruct the secretary then to put in a bid for the company. The bidding shall continue until all the shares are sold.

(18) The proceeds of the sale shall belong to the company and it shall pay the stub owners such a per cent. of the face of their stub as the total amount received for the stub shares bears to the total face value of the stub shares sold.

(19) On March 1 the stub shares shall be issued and payment for them received by the company and amounts due the owners on stubs paid.

(20) Any person who has been continuously in the employ of the company at the factory for 4500 hours and has contracted to place on deposit with the company subject to the purchase contract (see paragraph 26) all stock he may receive as remaining wages shall thereupon become an honorary employee.

(21) Any person shall be deemed to have quit the employ of the company who has absented himself from his work for one week or more, without first obtaining leave of absence from the superintendent.

(22) Any person who shall sell any of his stock or draw it out of deposit (see paragraph 35), who quits the employ of the company or who has been discharged ceases to be an honorary employee and is not entitled to remaining wages for that year unless reinstated by a vote of the directors.

(23) The fixing of all partial wages and salaries, and the hiring and discharging of employees shall be done by the general manager, superintendent or such other officer as the company may designate.

(24) Any person who shall quit the services of the company or be discharged prior to October 1 in any year shall forfeit the cash due him on December 1 for remaining wages. (See paragraph 9.) This does not apply to persons going on the retired list.

(25) Any employee, whether at the factory in Evansville or elsewhere, may deposit his stock with the company and receive the benefits resulting from so doing by signing the following contract:

Purchase Contract

(26) Contract between the Baker Mfg. Company of Evansville, Wis., hereafter designated as the company, and ———— of ————, hereinafter designated as the owner.

(27) This certifies that the owner has deposited with the company (————) shares of the Baker Mfg. Company's common stock herewith attached under the following conditions:

(28) The owner agrees that when he sells this stock, he will sell to the company at the market price less all indorsements made on it.

(29) The market price shall be determined by the directors by adding together the amounts received for the last 100 shares of the stock sold for cash, the price of which is definitely known, and dividing by 100.

(30) The owner agrees that the company may, by vote of the directors, purchase this stock without his consent at the market price

when he enters the employ of a competitor or has engaged actively in work for himself or for others for five years. (See paragraph 39.)

(31) If the owner works for the company until he retires and does not again actively engage in work for himself or for others, then the company may not purchase the stock without the owner's consent so long as he lives.

(32) In consideration of placing this stock on deposit under contract to sell, the company agrees to pay March 1 of each year from the stock purchasing fund (see paragraphs 7, 10, 11, 12) to the owner, after he is retired and so long as the owner's name continues on the retired list, $5 per share toward the purchase of the same, but the company will not make more than 15 payments or a total of $75 per share.

(33) In case the stock purchasing fund is not sufficient to indorse $5 on every share entitled to the indorsements, the directors shall decide what shares shall be skipped.

(34) The company agrees to purchase this stock whenever the owner requests it at the market price, less the indorsements if the market price is not above par, and if it has money in the stock purchasing fund to purchase with.

(35) In case the owner makes a written request to the treasurer for the company to purchase this stock and the company does not purchase in 30 days, then the owner may take the stock out of deposit by paying back to the company the indorsements and $5 per share.

(36) If the market price at the time this stock is sold is less than the indorsements, it shall not be necessary for the owner to refund anything to the company.

(37) The fact that indorsements have been made on the stock, even the full amount of $75 shall not prevent the owner from drawing his full common stock dividends nor voting his shares.

(38) When the owner has worked for the company 25 years, he may retire and his name shall be placed on the retired list and cannot be removed so long as he does not again engage actively in work.

(39) This matter of again engaging actively in work is to be decided by the directors on the merits of the case. In general, a man who earns annually less than one-half the living expenses of himself and those dependent on him shall not be considered engaging actively in work.

(40) Persons who have been in the employ of the company 20 years, persons 60 years old and persons who have been injured at the company's work to such an extent that they can no longer earn a living may be retired and their name placed on the retired list by the directors.

Explanation

As an example of what the new resolution will do for employees, suppose a man begins to work when he is 28 and gets his first stock when he is 30 years old. If for 25 years he receives an average of three shares of stock a year he will when he is 55 have $7,500 of stock. If he then retires, his income from the dividends on the stock will be $375 a year and from the $5 a share indorsements it will also be $375 a year, or a total of $750 a year; this will continue for 15 years or until he is 70 years old, when the indorsements will cease, but the $375 dividends will continue as long as he lives.

The money set aside for the stock-purchasing fund is only temporarily withheld from being paid in remaining wages and extra preferred dividends. Whatever is taken from the purchasing fund to buy stock is divided up at the end of the year in remaining wages and extra preferred dividends.

The interest on the $5 indorsements from the time they are made until the stock on which they are made is bought is a drain on the annual division, but it is probable the profit in purchasing stock below par will offset this several times.

It is not expected that the purchase fund will be more than sufficient to pay the indorsements on retired employees' stock and to purchase stock thrown on the market through death and broken health. Stock thrown on the market by abled-bodied men quitting, panicky times, and bad years in our business, will have to be purchased with the company's other resources, withdrawn from deposit and sold outside, or remain unsold. When there is stock waiting to be purchased and the purchase fund is not sufficient to purchase all of it, then naturally the stock with the most indorsements would be purchased first.

After bad years in our business and in panicky times, probably much stock will be on the market. Then outside buyers will be scarce and offer less than the prices determined according to paragraph 29. This price will therefore then be higher than the true market.

The company does not bind itself to buy stock except when there is money in the purchasing fund with which to buy. (See paragraph 33.)

If there is nothing in the purchasing fund to purchase with, then the company may, if it sees fit, use such other funds as it may have to purchase stock on or off deposit and offer any price it may see fit.

If the company were to buy all of its stock at par it would have to sell all its notes, mortgages, bonds, merchandise, buildings and land and go out of business.

Each share bought reduces the size of the company $100. It must make improvements and it should use so much of its annual gain for improvements and expansion as seems wise and only what is left to buy stock. At present the purchasing fund provided for by the by-laws seems to be all that should be set aside annually for that purpose. It can be increased or diminished as future experience seems to indicate.

It should also be observed that only that part of the purchase fund in excess of five times the last annual indorsement on stock on deposit can be used to purchase stock.

Should it happen for a series of years that the company did not make even enough to pay its common stock dividends, yet the purchase fund would be sufficient to pay the indorsements on retired employees' stock for about five years and may be much longer, as the company might, during this time, accept some desirable bargains in stock and pay for them with funds other than the stock-purchasing fund, and whatever the purchase was below par would be added to the purchase fund and make more indorsements possible on retired employees' stock.

Only active employees may deposit their stock with the company under the purchase contract. Employees permanently injured or contracting a fatal illness may not deposit their stock after such injury or after the beginning of such illness.

Southern Iron & Steel Company Finances

A majority of the committee which has for many months had in hand the reorganization and merger of the Southern Iron & Steel Company and the Alabama Consolidated Coal & Iron Company has recently sent a circular to stockholders of the former company. It refers to the receivership of the Alabama Consolidated company and the default in interest on some of its bonds, as making impossible the merger of the two companies. The committee explains that after a careful examination of the Southern Iron & Steel Company properties it is concluded that it will not be possible to reorganize the company at this time on terms that will provide sufficient working capital and pay for necessary acquisitions and betterments. A forced sale of the properties at this time, it is stated, would realize only an inadequate sum. In the meantime, in the discretion of the committee, securities or stock of the new company (other than those allotted by the modified plan to the holders of the securities) may be offered for sale for cash to the holders of stock of the Southern Iron & Steel Company. No other rights are given to the stockholders of the Southern company under the modified plan. The stock issued is to be held in trust for five years. The holders of notes and bonds of the company will receive beneficial certificates in the following proportions: The holders of $600,000 of notes (secured by $1,000,000 of bonds) par for par; the holders of $6,827,000 of bonds, 50 per cent; the holders of $1,200,000 of debentures, 20 per cent. This would total $4,253,000 of beneficial certificates. The committee may increase or decrease this amount, but the proportions will be as stated.

An action was brought at Birmingham, Ala., July 9, by the Lyle Milling Company and two other creditors representing total claims of less than $450 asking that the Southern Iron & Steel Company be declared bankrupt. The company filed a demurrer to the petition on July 11 alleging that it was not a bankrupt and demanding a trial by jury. The matter is still pending in the North Alabama Federal Court, in which the petition was filed. In view of the fact that the claims represented in the petition are less than the required $500, it is expected that the suit for a receivership will be denied.

A blast furnace is to be erected at Port Bolivar, Texas, it is reported, by Wesley Merritt and associates. Ore is to be shipped from the Ore City district, which has just been given a railroad outlet by the construction of the Port Bolivar Iron Ore Railroad. The site for the proposed furnace was purchased some time ago at a cost of $60,000.

The Ohio Workmen's Compensation Law

Unique in Providing a Voluntary Compensation System—Thus Far Comparatively Few Employers Have Elected to Pay Into the State Fund

The operation of the Ohio workmen's compensation law is being watched with a great deal of interest because of the movement in behalf of a Federal compensation law and the proposals that are being considered in various States. Workmen's compensation laws are now reported in operation in 12 States, but it is claimed that the Ohio law is the most advanced piece of legislation of this type and that nine other States now working on compensation measures will pattern largely after it. A feature of the Ohio law is that it creates a State fund from which benefits are paid.

The Ohio law is noteworthy in establishing a voluntary compensation system, whereas similar acts of other States are compulsory. The Ohio legislature was limited in this matter by the provisions of the State constitution, but the new constitution to be voted on at the next election will permit of compulsory compensation and it is very probable that if the new constitution is adopted this change will be made. As the law stands it is optional with an employer whether he comes under his operation by paying premiums into the State insurance fund or remains liable for damages under the general State law. An employer who does not elect to pay into the State insurance fund is made liable to his employees for damages for personal injuries due to the wrongful act, neglect or default of an employee or his agent; and if sued for damages he is not allowed to avail himself of the common law defences of fellow servant, assumed risk or contributory negligence.

State Competition with Insurance Companies

The optional features of the Ohio law has resulted in a keen competition between the liability companies and the State Liability Board of Awards for the business of protecting employers of labor. While various other objections have been made to the Ohio law the principal one now appears to be that rates are too high as compared with those of liability insurance companies. Another strong objection has been that paying into the State fund does not exempt an employer from damage liability for injury to an employee, where such injury has arisen from the wilful act of the employer or any of the employer's officers or agents or from the failure of the employer or any of the employer's officers or agents to comply with any municipal ordinance or order of any duly authorized officers, or with any statute for the protection of life or safety of employees. The meaning of the expression "the wilful act" has caused considerable discussion and the attorney general has ruled that it does not mean the same as wilful neglect and that an employer is not committing a wilful act if he is merely negligent.

As the result of a recent ruling by Attorney General Hogan the liability of an employer paying into the State insurance fund appears now to be about the same as under the protection of the liability companies. This ruling has been embodied in a letter ordering a new form of liability contract that was sent by the State Insurance Commission June 15 to all the liability companies doing business in the State. The decision of the attorney general in this matter was that the liability companies could not lawfully protect an employer against a suit by an injured employee for damages where the injury was not a mere accident but due to the wilful act of such employer or to the failure of himself or his officers or agents to comply with any municipal ordinance or lawful order of any duly authorized officer, or any statute for the protection of the life and safety of the employees.

Few Employers Elect to Pay Into State Fund

The Ohio law was put in operation March 1 and the little more than four months in which it has been in effect is too short a time to determine whether it will prove successful in meeting the competition of the liability companies. In the first four months 400 employers elected to take protection under the law, out of 15,000 to 20,000 eligible employers in the State. While this is apparently a poor showing for the law, it is pointed out that the bulk of employers are protected by liability companies whose contracts are made for from one to three years, and doubtless many employers will decide to go under the State law when their present policies with the liability companies expire. Some manufacturers say they would like to take advantage of the law but cannot afford to pay the increased cost as long as their competitors pay the lower rates of the liability companies.

The Ohio situation has consequently become a matter of competition for business between the comparatively few solicitors for the State fund and the numerous agents representing the liability companies. The former offer such compensation for injured workmen as is provided by the State law and the latter give only liability insurance but at a considerably lower rate.

State and Indemnity Company Rates Compared

Taking the classifications of particular interest to the metal working industries the figures below show the rate charged by liability companies in Ohio, the workmen's compensation rate provided by the Ohio State Liability Board of Awards and the workmen's compensation rate provided under the laws of New Jersey and Wisconsin. The percentages given are per $100 of pay roll:

	Liability company rate in Ohio	Ohio State rate	New Jersey rate	Wisconsin rate
Metal Machine shop and foundry.....	0.60	0.95	2.50	3.50
Ore reduction— Blast furnaces.....	2.50	2.65	6.00	8.40

It will be noticed that the Ohio State rate is much lower than that of the two other States named. The reason for the higher rates in New Jersey and Wisconsin is that the workmen's compensation laws of those States, while in other ways very much like the Ohio law, do not provide a State fund, but insurance is either carried by the employer himself or by regular liability companies. These companies must charge more to provide for administration, soliciting business, etc. In Ohio the entire cost of administration is borne by the State, so that every dollar that goes in the insurance fund in premiums is eventually paid back to workmen in awards. While the Ohio State rate noted above is not much higher than the liability companies' rate in the State, the workmen's compensation rate as given is the minimum rate. The liability company's rate is the same for all classes of risks in a specific industry. The State Liability Board of Awards has divided each industry into five classes based on the number injured and killed in the past three years. Class I, the rate for which is given above, includes plants having not over 10 accidents per $100,000 of wages per year and no deaths or permanent total disabilities during three years.

Awards Under the Ohio Law

Since the Ohio law went into effect 130 employees of concerns that pay premiums to the State have been injured and have secured awards from the State fund. In not a single case did an employee exercise his option to bring suit. Although the law provides that the employee shall pay 10 per cent. of the premiums, employers in every case so far have paid the entire amount, apparently finding this more satisfactory than going to the trouble of dividing the 10 per cent. among their employees and taking it from their wages, a small amount per week for an extended period. While a few fairly large employers of labor have taken advantage of the State premium provision the most of these concerns are rather small. The largest is the Brier Hill Steel Company, Youngstown, which has paid a premium of $10,000 for the protection of 3000 employees for a period of six months.

The schedule of awards under the Ohio law is as fol-

lows: For partial or temporary disability two-thirds of the impairment of the workman's earning capacity during the continuance thereof, not less than $5 nor more than $12 per week, and not to continue over six months or to exceed $3400. If an employee's wages are less than $5 a week, he is to receive his full wages. For permanent total disability he receives two-thirds of the average weekly wages, not more than $12 nor less than $5 a week, to continue until death. Full wages are to be paid if the employee's wages are less than $5 weekly. In addition to the above the State pays not to exceed $200 for medical services. In case of injury causing death within two years, payments are limited to medical services and a maximum of $150 for funeral expenses, where there are no dependents. If there are wholly dependent persons at the time of death the payment is two-thirds of the average weekly wages for six years from the date of the injury and not to exceed $3400 or to be less than $1500. If there are partly dependent persons the payment shall be two-thirds of the average wages for all or for such portions of six years after date of injury as the board may decide, but not to exceed $3400.

The Electric Furnace for Tempering Tool Steel*

BY B. HENRIKSON†

One cannot enter a railroad shop to-day and stand before a powerful modern wheel lathe and observe the immense chips which this machine removes almost at red heat without having a certain amount of wonder that man is able to produce a tool which makes such an operation possible. Not only do we see the wheel lathe taking off blue chips, but all metals in the shops are being worked at a speed undreamed of in the days of carbon tool steel. Much of this advance is due to the advent of the use of the rarer metals, such as vanadium, nickle, chromium and tungsten, but even their presence would be of no practical importance without the proper heat treatment of the metal after it has been manufactured. This change from the use of the old time carbon steel to the present day special steels is working a revolution in the methods which were formerly in vogue for tempering carbon steels. Temperatures are demanded which cannot be successfully attained in the ordinary forge without danger of altering the composition of the steel. Perhaps the strongest competition for the position of successor to the old forge is the modern electric furnace.

The best results so far obtained in a furnace requiring fuel have been brought about in the following manner. The tool to be tempered is placed in some sort of a receptacle and all the space between it and the walls of the receptacle is filled with finely divided charcoal. Then the receptacle is sealed up so as to be impervious to gas or air and placed in the furnace. The temperature of the furnace is brought to that required to give the tool the desired degree of hardness (about 2100 deg. F.) and this temperature is maintained until the heat has had a chance to penetrate entirely through and the whole mass is at one temperature. This requires about two hours. Then the receptacle is removed from the furnace and the tool taken out and plunged into an oil bath. The charcoal does not adhere to the steel. By this method an excellent job is obtained. An even heating of the steel prevents spring, thus giving accuracy to the result. By packing in charcoal and sealing, exposure to air, gas or fuel is prevented and consequently the chemical composition is not altered.

The nearest approach to the results obtained in the manner described is obtained by the use of the electric furnace. This supplies the place of the sealed receptacle, and as it requires no blast or fuel to obtain a high temperature the danger of altering the chemical composition is obviated. The highest desired temperatures can be obtained and by varying the strength of the electric current any desired degree of temperature can be obtained or maintained constant.

The Electric Furnace with the Liquid Bath

There are two distinct types of electric furnaces. One type is so constructed that it forms an open vessel in which is placed a substance which becomes a liquid at the hardening temperatures. The substance generally used consists of barium chloride and potassium chloride mixed in the proper proportion, this proportion depending upon the metal to be hardened and the temperatures desired. For very high temperatures only pure barium chloride is used. In some shops for temperatures below 700 deg. C. (1292 deg. F.) pure sodium nitrate is used and sometimes a mixture of sodium nitrate with potassium chloride. The author's experience does not cover use of nitrates. In practice it has been found that one objection to the use of this method is that the tongs used in removing the tools from the bath decompose and tiny particles of iron collect on cutting edges, and when plunged these particles become so hard that they can be removed only by grinding. Often it is impossible to grind them off without injuring the tool. Aside from this trouble, very good results are obtained in this furnace. The outer walls of the furnace are never hot, so there is no danger from fire and also the cooling bath may be placed close to the furnace, thus reducing to a minimum the time between removing and plunging.

The Resistance Type of Electric Furnace

The other type of furnace does not make use of a heating bath, but consists of a box-like structure which may be closed so as to exclude the outside air. The heat is generated by the resistance of carbon "resisters" located in the side walls of the furnace. The current strength and thus the temperature of the furnace is varied by altering the area of contact of these resisters. The greater the current which is allowed to flow the higher is the temper obtained. It is generally found that if the furnace is entirely closed a reducing action takes place, so a door is provided for the admission of outside air until the action is neutral. Care must be taken in using this furnace that too much air is not allowed to enter, for then oxidation takes place and the steel to be tempered will scale.

The electric furnace has this further distinct advantage over any kind of a furnace making use of a blast. With such a furnace it is next to impossible to maintain the temperature uniform in all parts so that the tool to be hardened will become hotter on one side than it is on the other and thus will be sprung out of its true shape. With the electric furnace no draft is required so that a purely soaking action takes place and the tool is evenly heated.

Granted that the electric furnace can produce just as good work as can be obtained with the most improved practice in the use of the furnace requiring fuel, we must still consider the following points in the operation of the furnace. The furnace is simplicity itself, so that highly skilled and consequently highly paid labor is not required to operate it. By using a pyrometer and knowing the proper temperature at which a given steel is to be hardened there is no longer the necessity to depend upon the judgment or experience of any one man, thus cutting down labor cost.

*Paper read before the Railway Tool Foremen, Chicago, July 10.
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Meeting of the Bridge Builders' Society.—The Bridge Builders' Society held a quarterly meeting July 11 and 12 at the Oriental Hotel, Manhattan Beach. The attendance was good, 25 members being present, including one from Kansas City and one from Minneapolis. It was stated that never before had there been displayed such cheerful sentiment regarding business conditions. Stress was laid upon the fact that better prices are ruling and the consensus of opinion was that the better condition would last. The plants of members of the society, as a whole, have about five months' work ahead of them at the normal rate of activity. While the society meets monthly for a one-day session in various cities, a two-day meeting is held each quarter in New York.

The Pressed Steel Company, Wilkes-Barre, Pa., which make a specialty of deep pressed and drawn steel products, has recently produced automobile brake drums of 3/16-in. metal, 14 in. in diameter, with a depth of 6 in., pressed cold in one operation, and is manufacturing this line of goods with a variation, it is stated, of less than 0.003 in. in diameter. The company is equipped to press steel shapes from 10 to 30 in. in diameter up to 9 in. deep in one operation.

Iron and Steel Statistics for 1911

Details of Production of Pig Iron, Semi-Finished Steel and Various Forms of Finished Material

The annual statistical report of the American Iron and Steel Association for 1911, Part 1 of which, a pamphlet of 104 pages, has just been issued from the association's office at Philadelphia, gives interesting details of the production of iron and steel in the United States last year. Part 2 will appear in September or October and will be devoted to the statistics of production of plates and sheets, merchant bars, skelp, tin plates, cut and wire nails, miscellaneous rolled iron and steel, and foreign iron and steel, iron ore and coal. The summary of the statistics thus far gathered, with comparison with 1910, is as follows:

Gross tons, except for coke.	1910.	1911.
Shipments of iron ore from Lake Superior	43,442,397	32,793,130
Production of iron ore	56,889,734	.....
Shipments of Connellsville coke, net tons.	18,689,722	16,334,174
Shipments of Pocahontas Flat Top coke, net tons	2,335,932	1,323,387
Production of pig iron, including spiegel and ferro	27,303,567	23,649,547
Production of spiegeleisen and ferromanganese	224,431	184,718
Production of Bessemer steel ingots and castings	9,412,772	7,947,854
Production of open-hearth steel ingots and castings	16,504,509	15,598,650
Production of all kinds of steel ingots and castings	26,094,919	23,676,106
Production of Bessemer steel rails	1,884,442	1,053,420
Production of open-hearth steel rails	1,751,359	1,676,923
Production of all kinds of rails	3,636,031	2,822,790
Production of structural shapes	2,266,890	1,912,367
Production of wire rods	2,241,830	2,450,453
Imports of iron ore	2,591,031	1,811,732
Exports of iron ore	748,875	768,386
Imports of iron and steel, foreign value	$38,907,119	$28,995,600
Exports of iron and steel, home value	$201,271,903	$249,656,411

Production of Pig Iron

The production of pig iron in 1911, classified according to the fuel used, was as follows, compared with the three preceding years:

Fuel Used— Gross Tons.	1908.	1909.	1910.	1911.
Bituminous, chiefly coke	15,331,863	24,721,037	26,257,978	23,141,296
Anthracite and coke	353,315	682,383	628,579	212,548
Anthracite alone	1,694	16,048	20,503	17,027
Charcoal	249,146	376,003	396,507	278,676
Total	15,936,018	25,795,471	27,303,567	23,649,547

Small quantities of pig iron made with charcoal and electricity are included in the charcoal figures. The totals also include small quantities of ferro-alloys made with electricity and with coke and electricity.

The following table gives the production of Bessemer and low-phosphorus pig iron by states in late years:

States— Gross Tons.	1908.	1909.	1910.	1911.
Pennsylvania	3,069,015	3,851,606	4,393,905	3,461,265
Ohio	1,907,529	3,628,046	3,460,736	3,283,970
Illinois	1,367,283	1,804,402	1,826,407	1,455,865
New York	483,900	628,426	834,632	449,841
West Virginia, Tennessee and Kentucky	121,703	293,837	267,577	367,436
Maryland and Virginia	183,879	284,356	326,614	258,236
Michigan, Wisconsin, Minnesota, Colorado and California	83,667	66,697	135,771	132,690
Total	7,216,976	10,557,370	11,245,642	9,409,303

The following table gives the production of basic iron by states since 1908:

States— Gross Tons.	1908.	1909.	1910.	1911.
New York and New Jersey.	110,167	466,919	414,228	321,765
Penna.—Allegheny County	1,854,327	3,187,687	2,807,551	2,883,927
Penna.—other counties	843,535	2,068,558	2,439,514	2,284,835
Virginia and Alabama	450,753	402,903	697,377	445,892
Ohio	278,386	845,956	1,155,434	1,111,741
Indiana and Illinois	270,750	970,471	1,281,904	1,224,254
Michigan, Missouri and Colorado	202,226	307,731	288,600	247,606
Total	4,010,144	8,250,225	9,084,608	8,520,020

The production of spiegeleisen and ferromanganese in 1911 amounted to 184,718 tons, against 224,431 tons in 1910, a decrease of 39,713 tons. Of ferromanganese alone the production in 1911 amounted to 74,482 tons, against 71,376 tons in 1910. Of spiegeleisen alone the production amounted to 110,236 tons in 1911, against 153,055 tons in 1910. These alloys were produced in 1910 and 1911 by Pennsylvania and Illinois only. Their total production since 1894 is given in the following table:

Years.	Gross Tons.	Years.	Gross Tons.
1894	120,180	1903	192,661
1895	171,724	1904	219,446
1896	131,940	1905	289,983
1897	173,695	1906	300,500
1898	213,769	1907	339,348
1899	219,768	1908	152,018
1900	255,977	1909	225,040
1901	291,461	1910	224,431
1902	212,934	1911	184,718

In addition to the above 47 tons of ferro-phosphorus were produced in 1902, 946 tons in 1904, 1243 tons in 1905, 142 tons in 1906, 1273 tons in 1908, 3385 tons in 1909, 3471 tons in 1910 and 6820 tons in 1911. In 1903 and 1907 ferro-phosphorus was not reported.

Pig Iron by Grades

The following tables give the total production of pig iron by grades from 1904 to 1911 in gross tons:

Grades— Gross Tons.	1904.	1905.	1906.	1907.
Bess. and low-phos.	9,098,659	12,407,116	13,840,518	13,231,620
Basic (mineral fuel)	2,483,104	4,105,179	5,618,674	5,375,219
Forge pig iron	550,836	727,817	597,420	683,167
Fdy. and ferro-sil.	3,827,229	4,758,038	4,773,011	5,151,209
Malleable Bessemer	263,529	635,236	699,701	920,290
Spiegeleisen	162,370	227,797	244,980	283,430
Ferro-manganese	57,076	62,186	55,520	55,918
White, mottled, direct castings, etc.	54,230	69,011	77,367	80,508
Total	16,497,033	22,992,340	25,307,191	25,781,361

Grades— Gross Tons.	1908.	1909.	1910.	1911.
Bess. and low-phos.	7,216,976	10,557,370	11,245,642	9,409,303
Basic (mineral fuel)	4,010,144	8,250,225	9,084,608	8,520,020
Forge pig iron	457,164	725,624	564,157	408,841
Fdy. and ferro-sil.	3,637,622	5,322,415	5,260,447	4,468,940
Malleable Bessemer	414,957	658,048	843,123	612,533
Spiegeleisen	111,376	142,831	153,055	110,236
Ferromanganese	40,642	82,209	71,376	74,482
White, mottled, direct castings, etc.	47,137	56,749	81,159	45,192
Total	15,936,018	25,795,471	27,303,567	23,649,547

The Bessemer figures include low-phosphorus pig iron, that is, iron running below 0.04 per cent. in phosphorus. Pig iron containing from 0.04 to 0.10 per cent. of phosphorus is classified as Bessemer.

Furnace Consumption of Iron Ore and Other Materials

The total consumption of domestic and foreign iron ore, not including mill cinder, scale, scrap, etc., in the manufacture of pig iron in 1911 is estimated at 43,980,000 tons, as compared with 51,739,000 tons in 1910. The average consumption of iron ore in 1911 per ton of pig iron was 1.859 tons, as compared with 1 894 tons in 1910. From 800,000 tons to 850,000 tons of iron ore is annually consumed by rolling mills and steel works.

In addition to the 43,980,000 tons of iron ore consumed in 1911 by blast furnaces in the manufacture of pig iron, about 3,760,000 tons of mill cinder, scale, scrap, slag, zinc residuum, etc., was also used, as compared with about 2,800,000 tons in 1910 and 2,535,000 tons in 1909. Adding these figures to the ore reported gives a total consumption in 1911 of about 47,740,000 tons, an average of about 2.018 tons of iron ore and other metallic material used per ton of pig iron made, as compared with about 54,539,000 tons, or an average of 1.997 tons, in 1910.

There was a marked decrease in 1911 by blast furnaces in the consumption of iron ore per ton of pig iron made as compared with 1910, but a considerable increase in the consumption of mill cinder, scale, etc. Of the total consumption of iron ore, mill cinder, scale, etc., by blast furnaces in 1911 about 92.1 per cent. was iron ore and about 7 9 per cent. was mill cinder, scale, etc., as compared with about 94.9 per cent. of iron ore and about 5.1 per cent. of mill cinder, scale, etc., in 1910.

The limestone, including dolomite, consumed by the blast furnaces in the production of 23,649,547 tons of pig iron in 1911 amounted to 12,086,956 tons. The average consumption of limestone per ton of all kinds of pig iron made was 1144.8 lb. in 1911, against 1191.8 lb. in 1910. The consumption in 1911 by anthracite and bituminous furnaces was 1153.6 lb., against 1204 lb. in 1910, and by the charcoal furnaces it was 405.4 lb. in 1911, against 369 lb. in 1910.

Production of All Kinds of Steel

The production of all kinds of steel ingots and castings in 1911 amounted to 23,676,106 tons, against 26,094,919 tons in 1910, a decrease of 2,418,813 tons, or over 9.2 per cent. The production in 1910 was the largest in the country's history. Of the total production in 1911 23,029,479 tons was ingots and 646,627 tons castings, as compared with 25,154,087 tons of ingots and 940,932 tons of castings in 1910.

Included in the total for 1911 is about 481,459 tons of alloy steel, of which 425,169 tons was ingots and 56,290 tons castings. Of the total alloy steel made in 1911 about 163,930 tons was Bessemer, 296,065 tons open hearth, 14,732 tons crucible, 6722 tons electric and 10 tons miscellaneous steel. The following table gives by states the production of all kinds of steel ingots and castings by processes in 1910 and 1911 in gross tons of 2240 lb.:

States—Gross tons all kinds of steel.	Bessemer.	Open hearth.	Crucible and all other.	Total ingots and castings.
Maine, Mass, R. I., and Conn	1,411	189,879	20,004	211,294
New York and New Jersey	355,717	679,152	34,692	1,069,561
Pennsylvania	2,338,813	9,594,914	56,796	11,990,523
Del., Md., Dist. of Col., Va., West Va., Ky., Tenn., Ga., Ala., La., Tex.	529,799	764,934	100	1,294,833
Ohio	3,268,994	1,721,549	3,567	4,994,110
Indiana and Illinois	1,335,053	2,196,144	7,596	3,538,793
Mich., Wis., Minn., Mo., Iowa, Okla., Utah, Col., Ore., Wash., and Cal.	118,067	452,078	6,847	576,992
Total for 1911	7,947,854	15,598,650	129,602	23,676,106
Total for 1910	9,412,772	16,504,509	177,638	26,094,919

In 1911 there were 282 works in 31 states and the District of Columbia which made steel ingots or castings, against 260 works in 28 states and the District of Columbia in 1910.

The following table gives by states the production by processes of all kinds of steel castings in 1911, as included in the totals of the table above:

States—Gross tons of castings only.	Bessemer.	Open hearth.	Crucible and all other.	Total castings.
Mass., Conn., New York and N. J.	12,116	63,091	3,468	78,675
Pennsylvania	8,098	244,303	1,793	254,194
Del., Dist. of Col., Va., W. Va., Ky., Tenn., Ala., La., Texas and Ohio	15,934	99,667	3,667	119,268
Indiana, Illinois and Michigan	10,031	106,223	3,979	120,233
Wis., Minn., Iowa, Mo., Oklahoma, Col., Utah, Ore., Wash. and Cal	10,922	57,907	5,428	74,257
Total for 1911	57,101	571,191	18,335	646,627
Total for 1910	58,335	863,351	19,146	940,832

There were 207 works in 27 states and the District of Columbia which made steel castings in 1911, against 179 works in 23 states and the District of Columbia in 1910.

Production of All Kinds of Rails

The production of all kinds of rails in the United States in 1911 amounted to 2,822,790 tons, against 3,636,031 tons in 1910, a decrease of 813,241 tons, or over 22.3 per cent. Included in the total for 1911 is 205,409 tons of girder and high T steel rails for electric and steel railroads. Of the total production of rails in 1911, 2,708,795 tons was rolled from Bessemer, open hearth and electric steel blooms or billets; 22,010 from new seconds, new defective rails and steel crop ends; 91,751 tons was renewed steel rails or rerolled from old steel rails, and 234 tons was iron rails. In the following table the production of all kinds of rails in 1911 is given by states:

States—Gross tons all kinds of rails.	Bessemer rails.	Open-hearth rails.	Electric, re-rolled steel, and iron.	Total. Gross tons.
New York, New Jersey and Maryland	284,230	184,955	21,795	490,980
Pennsylvania	352,331	477,228	10,104	839,663
West Virginia, Alabama and Ohio	.....	427,691	20,214	447,905
Indiana, Illinois, Colorado and Washington	416,859	587,049	40,334	1,044,242
Total	1,053,420	1,676,923	92,447	2,822,790

Included in the 92,447 tons of rails rolled in 1911 and classified as electric, rerolled steel and iron rails are 234 tons of iron rails, 462 tons of rails rolled from electric steel and 91,751 tons of renewed rails or rails rolled from old steel rails which the makers were unable to classify as Bessemer or open hearth. This last amount, therefore, could not be put under Bessemer or open hearth; but of the 22,010 tons above referred to as from new seconds, steel crop ends, etc., 19,379 tons was Bessemer and 2631 tons open hearth.

Production of Wire Rods

The total production of iron and steel wire rods in 1911 amounted to 2,450,453 gross tons, against 2,241,830 tons in 1910, an increase of 208,623 tons, or over 9.3 per cent. In 1911 the steel wire rods rolled amounted to 2,449,843 tons and the iron rods to 610 tons, as compared with 2,241,203 tons of steel and 627 tons of iron rods rolled in 1910. Small quantities of steel copper-clad wire rods are included in the totals for these years. The maximum production of wire rods was in 1911. The production since 1908 was as follows:

States—Gross tons.	1908.	1909.	1910.	1911.
Mass., R. I., N. Y. and N. J.	200,113	280,101	246,669	244,300
Penna., Ky., Ga., Ala. and Ohio	1,047,243	1,388,237	1,412,352	1,585,973
Indiana, Illinois and Colorado	569,593	667,347	582,809	620,180
Total	1,816,949	2,335,685	2,241,830	2,450,453

Wire rods were rolled in 1911 by 35 works in 12 states, against 35 works in the same number of states in 1910. In 1911 Pennsylvania rolled over 41.4 per cent. of the total production, against over 37.8 per cent. in 1910. At the close of 1911 one wire rod mill was under construction in Alabama. The following table gives the production of iron and steel wire rods from 1888 to 1911 in gross tons:

Years.	Tons.	Years.	Tons.
1888	279,769	1900	846,291
1889	363,851	1901	1,365,934
1890	457,099	1902	1,574,293
1891	536,607	1903	1,503,455
1892	627,829	1904	1,699,028
1893	537,272	1905	1,808,688
1894	673,402	1906	1,871,614
1895	791,130	1907	2,017,583
1896	623,986	1908	1,816,949
1897	970,736	1909	2,335,685
1898	1,071,683	1910	2,241,830
1899	1,036,398	1911	2,450,453

Production of Structural Shapes

The statistics of the production of iron and steel structural shapes embrace beams, beam girders, zee bars, tees, channels, angles and other structural forms which are rolled for strictly structural purposes, but they do not include plates, girders made from plates or bars for reinforced concrete work. Nor do they include small angles, small channels, etc., for use in the manufacture of bedsteads, agricultural implements, safes, vaults, fences, etc. Plates and concrete bars are provided for under other classifications, and all plates cut to specifications are included in the general statistics of plates. For 1910 and 1911 the figures do not include some small forms of rolled iron and steel which were included in statistics of the production of structural shapes in 1909 and some other years, the figures for 1910 and 1911 being carefully limited to such forms of iron and steel as are well known to the iron trade in the erection of buildings and the building of bridges, viaducts, ships and other structures.

The total production of strictly structural shapes in 1911 was 1,912,367 tons, against 2,266,890 tons in 1910, a decrease of 354,523 tons, or over 15.6 per cent. Of the total production in 1911 about 1,911,556 tons was rolled from steel and about 811 tons from iron, against 2,266,464 tons rolled from steel and 426 tons rolled from iron in 1910. The production since 1908 by states was as follows:

States—Gross tons.	1908.	1909.	1910.	1911.
New York and New Jersey	86,044	177,483	1,853,407	1,565,437
Pennsylvania	810,146	1,642,074		
Alabama and Ohio	31,287	60,213	40,433	30,773
Indiana, Illinois, Wisconsin and California	155,704	395,792	373,050	316,137
Total	1,083,181	2,275,562	2,266,890	1,912,367

Eight states rolled structural shapes in 1911, against the same number in 1910. Pennsylvania made over 76 per cent. of the total production in 1911, against over 75.7 per cent. in 1910. Illinois, Indiana, New York, Ohio, Alabama, Wisconsin and California were the next largest producers

in 1911. In 1911 there were 25 works which rolled structural shapes. The following table gives the production from 1892 to 1911:

Years.	Gross tons.	Years.	Gross tons.
1892	453,957	1902	1,300,326
1893	387,367	1903	1,095,813
1894	360,305	1904	949,146
1895	517,920	1905	1,660,519
1896	495,571	1906	2,118,772
1897	583,790	1907	1,940,352
1898	702,197	1908	1,083,181
1899	850,376	1909	2,275,562
1900	815,161	1910	2,266,890
1901	1,013,150	1911	1,912,367

In the 10 years from 1892 to 1901 the increase in production amounted to 559,193 tons, or over 123 per cent., while in the 10 years from 1902 to 1911 the increase in production amounted to 612,041 tons, or over 47 per cent.

Two New Molding Machines

The line of molding machines built by the Arcade Mfg. Company, Freeport, Ill., has recently been increased by the addition of two new types. One of these which is shown in Fig. 1 is designated by the builder as its No. 100 combination jolt ramming and squeezer machine and is a portable molding machine for light work. The other machine which is known as the Midget core jolt is illustrated in Fig. 2.

As the name of the machine shown in Fig. 1 indicates it embodies two kinds of mold ramming, namely, the jolting and the squeezing forms. In some work it is convenient to use the jolting operation alone for making both the cope and the drag halves of the mold while in other cases the combined jolting and squeezing features may be used. Where a simple squeezer molding machine is desired the work can be performed by merely moving the operating lever. To facilitate the work a pneumatic vibrator is attached to the table and is operated by a knee lever at the front of the machine.

The head of the machine is adjustable to a large number of positions so that practically any type of flask work can be handled. It is arranged to provide a number of conveniences for the operator and has stands for holding match plates and bottom boards, a riddle holder and a tool rack. The mechanism is very simple and is entirely automatic. The movable head is counterbalanced by a heavy spring and when it is tilted back as shown in Fig. 1, the valve regulating the jolting is opened and the operation proceeds by manipulating a lever at the left of the machine. After the mold has been jolted and struck off and the squeezing board adjusted, the head is swung forward, this operation automatically closing the valve which controls the jolting mechanism. The lever which regulates the jolting is the same as that used in turning on the air for the squeezing. After this has been accomplished the head is pushed back, the pneumatic vibrator is set in motion by the knee pad and the patterns are drawn.

This machine will handle flasks measuring up to 18 x 26 in. The distance between the uprights is 32 in. and the extreme width of the machine is 40 in., while the hight from the table to the floor is 28 in. The size of the cylinder is 10 in. and the approximate air consumption per mold is 1 cu. ft. The complete machine weighs approximately 1000 lb.

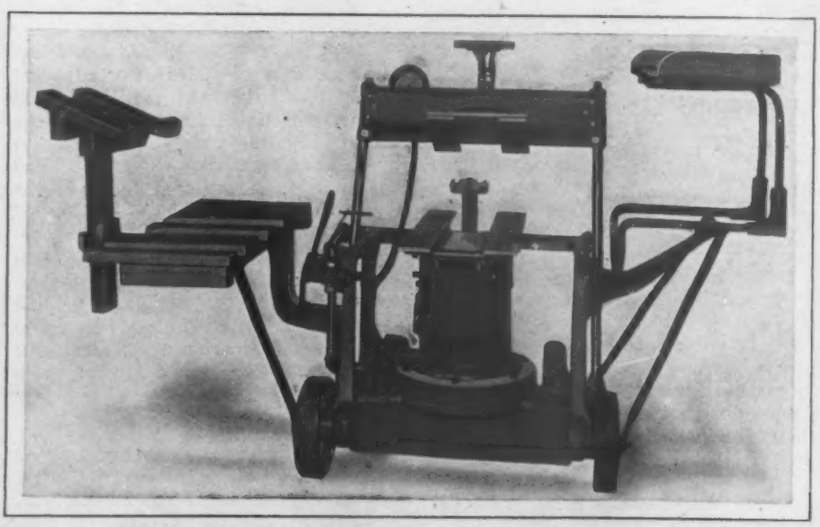


Fig. 1—The No. 100 Combination Jolt Ramming and Squeezer Molding Machine Built by the Arcade Mfg. Company, Freeport, Ill.

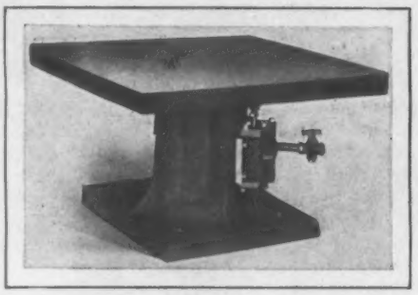


Fig. 2—The Midget Core Jolt

The Midget core jolt which is illustrated in Fig. 2 is designed to be placed so that the top of the table is level with the coremaker's table. The extreme hight of the machine is approximately 12 in. and the lifting capacity is between 300 and 400 lb. The cylinder is 4 in. in diameter and the table measures 16 x 20 in. This machine can be arranged to operate either with a globe valve or with a knee lever, the latter being the one most widely used. The valve mechanism is of a special type which has been patented by the company and is claimed to be very efficient.

Building Expenditures Show Increase

Comparisons of expenditures in building operations for the month of June and for the first half of 1912, with those for like periods of 1911, according to returns received by Bradstreet's, make a favorable showing, although it is indicated that in several of the large cities, including New York, there was a falling off in building investments in June. Reports from 121 cities in the United States show a total expenditure of $84,023,271 last month, while the figures were $78,309,951 for the same cities in June, 1911. In May, 1912, $83,668,036 was expended. The percentage of increase of June over May of this year is but 4-10 of 1 per cent., while compared with June of last year the increase is 7.2 per cent. In the second quarter of this year there was expended in the cities reporting $276,690,546, a gain of 14.5 per cent. over the same quarter of last year. The total expenditures for the first six months of this year were $541,297,895, which means a gain of 9.1 per cent. over the similar period in 1911 when $413,478,991 was expended.

An interesting disclosure of the reports is that 61 out of 121 cities reporting for June show gains. In New York City (three boroughs reporting) there is a decrease of 2.4 per cent. Other cities which showed a decrease were Cleveland, Minneapolis, Newark, N. J.; Philadelphia, Pittsburgh and Portland, Ore. Among the cities which showed gains over last year were Buffalo, Chicago, Detroit, Hartford, Indianapolis, Kansas City, Los Angeles, Milwaukee, Rochester, San Francisco and St. Louis, all with expenditures in excess of $1,000,000 each.

It is expected that B furnace of the Toledo Furnace Company, Toledo, Ohio, which was put out for relining on June 29, will be blown in about August 15.

Chilled Wheels and 50-Ton Cars

Performance of Cast-Iron Wheels Under Freight Cars of Large Capacity

The following communication, written on behalf of the Association of Manufacturers of Chilled Car Wheels, appeared in the Railway Age Gazette of June 15:

There have been so many statements made for the purpose of making inroads on the standard chilled iron car wheel business, and particularly with reference to the use of this wheel under cars of heavy capacities, that an actual analysis of a miscellaneous lot of wheels (some of which have been in service six years) will show that this wheel has not only given a satisfactory account of itself, but that the possibilities of future increases in car capacities have no significance, because the chilled iron car wheel will perform equally well under even heavier cars than are in use to-day.

Increases in Car, Rail, Axle and Wheel Weights

Attention is first called to the development of the freight car from 10 tons to 50 tons. Previous to 1875, the maximum freight car capacity was 10 tons; from 1875 to 1884 it was 25 tons; in 1886, 30 tons; in 1896, 40 tons; from 1901 to the present time, 50 and 55 tons. Comparatively few cars in service are over 55 tons capacity.

The wheels designed to carry these cars were as follows: 10-ton car, 525-lb. wheel; 25-ton car, 550-lb. wheel; 30-ton car, 600-lb. wheel; 40-ton car, 650-lb. wheel; 50-ton car, 700-lb. wheel.

It was not until the year 1909 that the Master Car Builders' Association changed its standard for 30, 40 and 50-ton capacity cars as follows: For 30-ton capacity car, 625-lb. wheel; for 40-ton capacity car, 675-lb. wheel; for 50-ton capacity car, 725-lb. wheel.

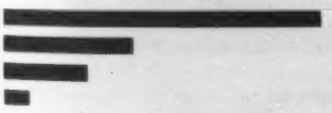
Particular attention is called to this fact, because the wheels that are now being furnished according to the Master Car Builders' Association recognized standard, adopted during 1909, were first applied during 1910. Therefore, the statement which I will submit will be principally for wheels furnished under 50-ton cars prior to 1910, which were the regular 700-lb. wheels. Wheels furnished in 1910 and subsequently thereto weighed 725 lbs.

During the rapid development of the freight car from 10 tons to 50 tons, all parts of the car have been increased in weight, and the rail also, but no part of the car or rail has shown such a slight increase as the chilled iron car wheel. Note the following showing a comparison of the 10-ton capacity cars with cars of 50 tons capacity:

	Per Cent. Incr'se.
Car capacity, increased from 10 tons to 50 tons	400
Weight of axle, increase from 350 lb. to 870 lb	149
Weight of rail, increase from 50 lb. to 400 lb	100
Weight of wheel, increase from 525 lb. to 725 lb	38

The following diagram shows the relative increases in car, axle, rail and wheel:

One-half inch represents 100 per cent. increase.



Note that the standard wheel for 50-ton capacity cars up to the year 1909 weighed 700 lb., an increase of 33 1-3 per cent.

The Record of Wheels Under 50-Ton Cars

According to the Interstate Commerce Commission report for the year ended June 30, 1910, there were in service about 383,000 freight cars of 50 tons capacity, which would represent about 3,000,000 wheels. Attention is directed to the following statement which represents the performance of about 22 per cent. of all the wheels in service under 50-ton cars. The record of the performance of the remainder of the wheels in service is not accessible.

	Shipments.	Replacements.	Per cent. Replaced.
1906	167,207	2,861	1.7
1907	165,110	1,318	.8
1908	76,117	793	1.0
1909	78,256	890	1.1
1910	105,654	258	.2
1911	84,894	19	..
Total	677,238	6,139	.9

It will be observed that out of a total of 677,238 wheels shipped, there were 6139 wheels removed which were defective and which the makers were compelled to replace. An analysis of the replaced wheels shows that replacement was for the following causes:

Worn tread	1,028
Shell out	1,987
Cracked plate	2,197
Seam	531
Broken flange	86
Broken rim	105
Broken	8
Miscellaneous defects	197
Total	6,139

It is well known that the flange of the chilled iron car wheel has not increased proportionately with the remainder of the wheel, and this has been because the Master Car Builders' Association has been confined to limits of track clearance. Notwithstanding this, it is interesting to know that the flange failures are comparatively few.

This statement shows total shipments of 677,238 wheels, there having been removed on account of broken flanges, 86 wheels, or one wheel in every 7875 wheels shipped. And it must be remembered that not every broken flange is due to an inherent defect in the wheel, because there may be many contributing factors over which the makers have absolutely no control, as in the cases of defective frogs, crossings and rail. Furthermore, faulty inspection may be a contributing factor, as sometimes a wheel may be allowed to wear too much before being removed; the strength of the flange is consequently decreased. In addition it must be remembered that the flange of the wheel furnished prior to 1910 was not as strong and serviceable as the one now being supplied under the Master Car Builders' Association standard recommended in 1909.

Replacements of 1906 and 1907 Wheels

In analyzing the performance of this lot of wheels under 50-ton cars, it must be remembered that all of the wheels are sold under a minimum guarantee time service of four years. The makers will, therefore, have to consider further replacements of wheels sold during the years 1908 to 1911 inclusive, but the wheels sold during 1906 and 1907 have practically fulfilled their guarantee as far as the manufacturers' liability is concerned, and a very large part of those sold during 1906 and 1907 are still in service.

A separate analysis of the wheels sold during the years 1906 and 1907 will give an actual demonstration of the performance of the wheels, and therefore attention is directed to the following:

	1906.	1907.
Total shipped	167,207	165,110
Replaced account worn tread	498	233
Replaced account shelled out	1,094	431
Replaced account cracked plate	896	327
Replaced account seam	186	214
Replaced account broken flange	48	21
Replaced account broken	1	2
Replaced account broken rim	31	41
Replaced account miscellaneous defects	107	49
Total replaced	2,861	1,318
Percentage replaced	1.7	.8

While there may have been isolated cases where wheels have not given satisfactory service under some classes of 50-ton cars, the record of the performance of this lot of wheels ought to silence those who question the limitation of the service of the chilled iron car wheel; and if in the future it may be advisable to increase the capacity of the car still further, the chilled iron car wheel can be relied upon to safely carry loads up to 125 tons capacity.

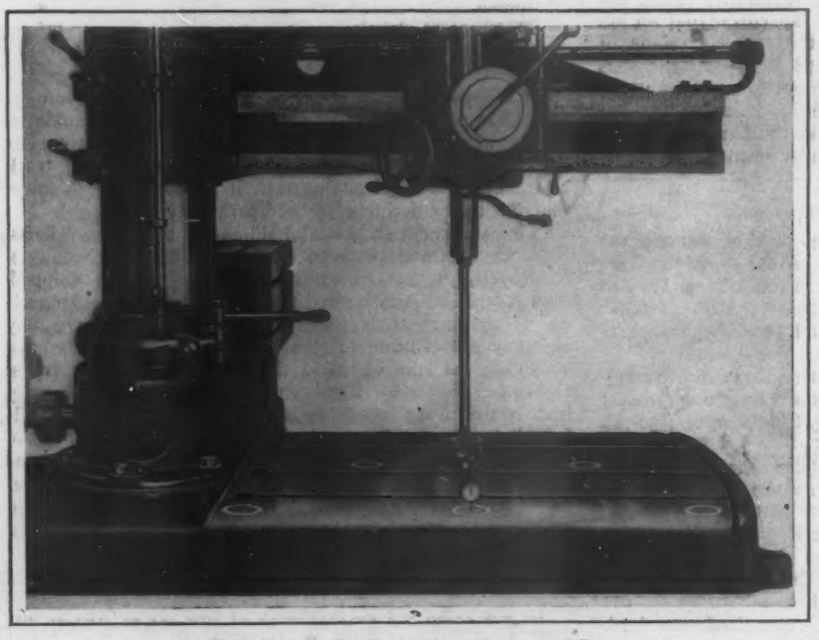
The American Railway Association's fortnightly statement says that on July 4 the net surplus of freight cars on the lines of United States and Canada was 64,024, compared with 67,718 two weeks previous, a decrease of 3694. At the corresponding time in 1911 the total of idle freight cars was 163,521.

Secretary William S. Dickson, of the Cincinnati branch, National Metal Trades Association, has issued invitations for the annual employees' outing to be held at Chester Park July 27. About 30,000 employers and employees are expected to attend.

Assembling a Radial Drilling Machine

An Insight Into Some of the Final Details of Manufacture Practiced by the American Tool Works Company, Cincinnati

A few weeks ago a pamphlet issued to give an insight into the shop methods of manufacture of the American Tool Works Company, Cincinnati, Ohio, was reviewed in these columns. The opportunity is here offered to present a reproduction of a photograph of the details pursued in the American Works in testing the arm of a radial drilling machine and the following information in relation thereto has been obtained:



Method of Testing Parallelism of Arm and Base

There are occasions when a radial drilling machine is expected to produce accurate results. This requires that the base shall be accurately planed, that the base shall be accurately mounted with respect to the columns and with respect to the arm and with respect to the spindle. The base is tested by a straight edge crosswise and diagonally, and strips of tissue paper are placed between the straight edge and the base, so that the comparative tension of the paper will give some information regarding imperfections in the planing operation.

The columns, turned on a lathe, are tested with micrometers, after which they are sent to the boring department where they are bored and reamed through jigs.

The radial arms are first split and drilled and are then bored out to standard gauges on a horizontal boring machine. They are then taken to the planing department where they are planed by means of a jig to locate accurately the arm "ways" in their relation to the column center. Before removing the arms from the planer, the ways are tested with standard bearing blocks.

A jig is also used in planing the dovetails of the head casting which are afterwards tested with angle blocks. The back gear brackets are bored and reamed through jigs, after which the bronze bushed bearings are inserted. After being planed, the arm ways and arm bearing on the head are cross scraped to remove the loose metal and are then tested with surface plates for perfect bearing surfaces. If necessary these surfaces are scraped to remove imperfections. Little fitting need be done, it is found, by scraping, however, for these surfaces are planed with jigs. The gears are cut with a special cutter adapted to the exact number of teeth in each gear and they are tested on a special gear-testing machine.

The alignments of the machines are secured briefly as follows: After the base reaches the erecting floor it is leveled and again tested with a straight edge and test papers to prove accuracy. The column seat on the base is tested with a surface plate and any necessary scraping is done to insure an accurate bearing between the base and the column. The column is then bolted to the base, and the sleeve, arm, head and driving mechanisms are assembled.

The arm is tested for alignment with the base. A tram holding a sensitive indicator is placed in the spindle and the head is run along the arm as far as possible toward the column. Here an indicator reading is taken on the base. The head is moved to a central position on the arm and another reading is taken as indicated in the illustration. A further reading is taken with the head at its extreme position from the column. If these all correspond it is evident that the arm is perfectly parallel with the base.

The next test is to prove the accuracy of the spindle in relation to the base. The head is locked in a central position on the arm and, with the tram still in the spindle, readings are taken at four equally distant points around the circumference of an imaginary circle described by the indicator point when the spindle is revolved. If the readings coincide, it proves that the spindle revolves in a plane exactly perpendicular to the base.

After all the tests are completed, including the use of an automatic head moving device attached to the head of the drill, by means of which the head is run back and forth along the arm to eliminate stiffness in the movement of the head, the machine is turned over to the inspector in charge, who verifies and records its alignments. An inspection record, signed by the chief inspector, is filed away for future reference.

The "Sleeping Sickness" of American Profits

In the weekly financial review of J. S. Bache & Co., New York, the relation of the railroad situation to the meagerness of present profits of industrial companies is commented upon as follows:

"General business seems to lack the encouraging features evident in iron and steel. The volume is large, in some cases enormous, but the element of good encouraging profit is lacking. Prices have advanced and are held firmly, but expenses increase with large volume, and these are not adequately offset with corresponding margin of profit. Labor is constantly making larger demands and higher wages seem invariably to produce less efficiency. The fact is, the greatest business of all, that of railroads, is suffering, and we can never have full prosperity unless this matter is adjusted. The Interstate Commerce Commission has landed with a deadly clutch on the backs of the railroads, and nothing seems in sight to loosen this hold. Expenses of the roads have been increasing enormously through the requirements of the Commission in extra clerical charges, and in reduction of labor hours. It is said that one large road was compelled to increase its yearly clerk hire at its main office to the extent of $400,000, besides adding to its clerical forces all along the line. In addition to this, a steady stream of required reductions in rates is being ordered, and hardly a day passes without some addition to the cases. This situation of the railroads is the real cause of lagging prosperity, and far more than politics and tariff this is keeping up the sleeping sickness of American profits."

The W. F. Robertson Steel & Iron Company, Cincinnati, has acquired the stock and business of the American Can Company's tin roofing cap and tufting washer departments, and will soon make arrangements to increase the output of its plant in Cincinnati. The American Can Company will discontinue the manufacture of both roofing caps and tufting washers at all of its plants.

American Institute of Mining Engineers

Examining Committee's Conclusions

The following summary is given by the Engineering and Mining Journal, of the report of the committee of five appointed at the annual meeting in New York in February, 1912, to examine into the affairs of the American Institute of Mining Engineers. Copies of the full report are now being mailed to members. The committee consisted of C. R. Corning, chairman; A. R. Ledoux, William H. Nichols, Jr., J. T. Kemp and George C. Stone. The Engineering and Mining Journal, in commenting on the report, takes exception to the recommendation that the appropriation for the retired secretary be eliminated or greatly reduced. It says that Dr. Raymond devoted the greater part of his life to the building of the Institute and that to dispense with the allowance made him is "an economy a body of gentlemen cannot consider." Concerning the indebtedness of $74,000 on the land on which the engineering building stands, the editorial suggests that any further attempt to raise the money through a committee appealing to corporations and capitalists is objectionable and that a better way is to adopt the $5 increase in dues for a sufficient time to liquidate the debt. The summary of the report follows:

1. The Institute has been running behind $2,000 a year in ordinary net income, and $7,884 more if the land should be paid for in equal annual installments plus interest.

2. Prior to this year the technical, social and business affairs have been practically under a one-man management. This is generally undesirable and has become impossible in a society of our present size and diversified activities and should be changed.

Forms of Retrenchment

3. The publications have been admirable and of high standing and we would deprecate any change in type, printing, paper or other literary characteristics, and we suggest that each year in the year book or other prominent part of the publications all three fundamental documents underlying the Institute be published—not only, as heretofore, the constitution and the by-laws, but the certificate of incorporation as well; but we believe that the cost can be materially reduced by reductions and adjustments, even in addition to those which the directors and council have inaugurated in 1912, so that a saving of over $5,000 can be effected in this line.

4. We have indicated in the body of the report other savings in expense through greater efficiency, prompt adherence to office hours and otherwise.

5. On page 11 of the report, the committee has given in detail its views and its reasons for recommending the legalizing of the office of secretary emeritus and will later, as part of the proposed changes in the constitution and by-laws, point out the steps necessary to that end.

6. The putting into effect of recommendations as to a reduction of salaries of secretary and the retired secretary, if continued, and of editorial expense with other economies elsewhere suggested, we believe would bring down the deficit very largely, or entirely eliminate it. We believe, in brief, in cutting all expenses and all operations likely to involve such to the absolutely necessary minimum to make the budget of the Institute, all financial obligations of whatever nature included, balance.

7. We advise that the annual meeting, which has now been adjourned until October, shall take up and carefully consider suggested alterations in constitution, that such of them as meet the approval of the membership may be put into effect at the annual meeting of 1913.

Changes in Administration

8. We urge the board of directors likewise to inaugurate as soon as possible amendments in the by-laws so that responsibility shall be distributed and not placed upon one individual, and to put into effect still further improvements in addition to those already inaugurated by the directors.

9. We recommend the copyrighting of all papers accepted and printed.

10. We advise that delinquent members be dropped after 12 months' delinquency.

11. We recommend that the election of life members be limited to 5 per cent. of the actual membership, and that the receipts from life memberships be set apart toward the accumulation of a fund for the liquidation of the mortgage and interest thereon, and not turned into the general fund of the Institute to meet ordinary expenses, and that after the indebtedness be lifted they be invested in trust funds and the interest thereon used to meet the Institute's obligations to its life memberships.

12. We suggest for serious consideration the postponement of the publication of the "Emmons Volume" unless the directors and council are satisfied that there will be such a demand for it as immediately to meet the first expense of, say, $2,100, which we understand will be payable next fall.

Finally, we wish to express our absolute confidence in the continued value of the Institute to all of its membership; our conviction of the possibility of its greater future efficiency until its publications become indispensable to the profession, and membership a coveted honor. We urge the present membership to increased interest and co-operation so that as soon as possible proposed constitutional changes may be intelligently discussed and properly authorized, and we record our fullest confidence in the board of directors and council as at present existing, which have already initiated many important changes in methods, and have continued to great advantage their efforts since the last annual meeting. Due credit should be given to those of our members who have consented and who shall consent to accept offices whose duties are and will be no sinecure, if our recommendations are adopted.

The membership should keep itself informed as to the affairs of their society, and by attendance and discussion at meetings and otherwise, inquire and criticise and be assured to their satisfaction that the business, both technical and financial, is conducted by modern methods and in a manner to insure prosperity.

Conclusions

Summing up, therefore, concerning the *specific* questions intrusted to us for our consideration, we recommend:

(*a*) That the vote on the constitutional amendment to change the name of the Institute be kept open for careful consideration and decision in 1913.

(*b*) We recommend a negative vote upon the amendment proposed last February, authorizing an increase in dues, believing that the economies proposed, some of which are already in effect, will not only do away with the deficit, but provide an adequate income, possibly even providing sufficient funds to liquidate the mortgage.

(*c*) We recommend a negative vote on the proposal to reclassify retroactively the present membership, leaving any reclassification of membership for a more careful consideration later on.

Bagley, Mills & Co., Ltd., 92 Victoria street, London, and 50 Church street, New York, representing Carl Still, Recklinghausen, Germany, note the receipt of a repeat order from the Concordia Mining Company, Oberhausen, Germany, for a battery of 55 Still regenerative high capacity coke ovens, equipped with the new Still direct ammonia recovery plant. These ovens take a charge of 12½ to 13½ tons and the coking period shows a considerable reduction from recent usual practice. Carl Still is also erecting a direct recovery plant for the König Ludwig Colliery Company for 480 ovens.

A report of fires in May, 1912, published by the Boston Manufacturers' Mutual Fire Insurance Company, shows 66 fires under Grinnell automatic sprinklers, involving a total loss of $4,446, and an average of only $67.40 per fire. Reports are made of fires in properties not protected by automatic sprinklers, in which the total loss was $21,975, or an average of $1,831.25 per fire. This contrast is thoroughly typical of the results month by month, and shows why it is possible for insurance companies to cut the rates in two when automatic sprinklers are installed to protect the properties.

Templeton, Kenly & Co., Ltd., Chicago, makers of Simplex car and track jacks, have moved their offices and shops to their new plant on South Central avenue, Chicago. The office address is 1020 South Central avenue.

New Heavy Drilling Machine

Details of a Recent Foote-Burt Product for Handling Mud Rings, Flue Sheets and General Heavy Work

Economical handling of mud rings and flue sheets was the object sought by the Foote-Burt Company, Cleveland, Ohio, in the design of its new heavy drilling machine. Although this is the special field of the machine it is also adapted for general lines of heavy work. The special features of the machine are the making of both heads independent and self-contained units, massive construction and the use of a simplified motor drive supplied by the Reliance Electric & Engineering Company, Cleveland, Ohio. Fig. 1 is a front view of the machine, while an end view showing the way in which the motor drive is secured is given in Fig. 2.

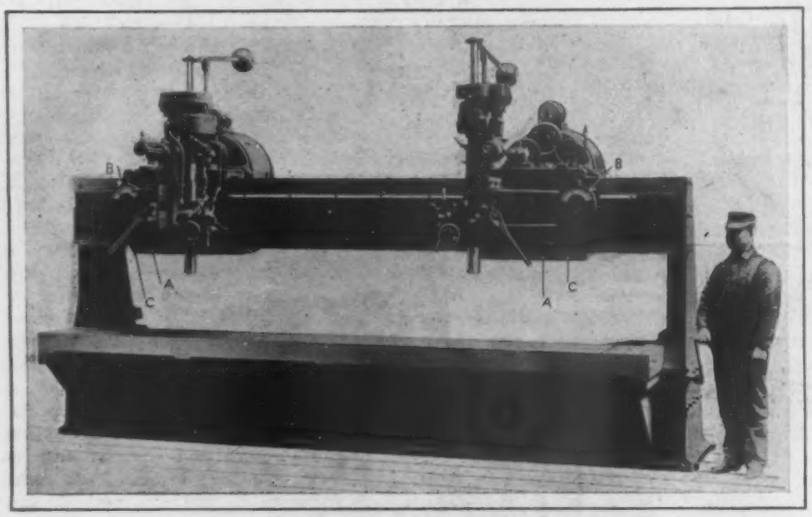


Fig. 1—Front View of a New Heavy Mud Ring and Flue Sheet Drilling Machine Built by the Foote-Burt Company, Cleveland, Ohio

Referring to Fig. 1, it will be noticed that each of the two heads is an absolutely independent and self-contained unit, an arrangement which permits flexibility in operation and enables the correct speeds and feeds to be maintained for any size of holes. These are secured independently, being operated under each spindle. The heads have an in-and-out adjustment of 8 in. on the knee and this in combination with the 24-in. in-and-out adjustment of the table makes it possible to handle a large drilling lay-out at one setting. The saddles carrying the heads and motors are of very massive design, having a four-point bearing on the crossrail, which is of box section. They are adjusted along the rail by the ratchet wrenches shown which does away with the necessity of stopping the spindles, the movement being obtained easily through reducing gears. Provision is made for taking up any wear that may occur.

An end view of the machine is given in Fig. 2 and shows not only the massive construction but also the way in which the motors are mounted and the drive is obtained. It is pointed out that by employing this method of mounting, the drive is simplified and the maximum efficiency is secured. A single pair of forged steel bevel gears with planed teeth running in extra long bronze bushings are used. The drive from the motor is through a rawhide pinion and a coarse pitch spur gear and the power is finally delivered to the spindles through spur gears, an arrangement which simplifies the drive and insures the delivery of the maximum power of the motor to the point of the drill. Each spindle has an individual clutch drive, thus enabling it to be started and stopped at will without the necessity of stopping the motor. In this way the motor can be adjusted for a certain speed and need not be disturbed if it should become necessary to stop the spindles for any reason.

The feed changes are obtained through a quick change gear device, operated by a lever within easy reach of the operator. Power feed with an automatic stop is provided, together with the customary hand knockoff and clutch. A quick return which is controlled by spider hand wheels is also available. The spindles and the feed worms are equipped with ball thrust bearings. Each head has an individual oil pump and its own tank, which permits the spindles to be operated individually and insures the delivery of the cutting compound to the drill.

The motor drive, which was supplied by the Reliance Electric & Engineering Company, illustrates the possibility of using motors having a large speed range and at the same time securing a direct drive without employing a number of change gears. The drive includes the shifting of the motor armature to secure the desired speed and a combination of automatic starting and speed control which enables the operator to give his entire attention to the work.

The motors used are 7½-hp. Reliance adjustable speed motors of the armature shifting type having a speed range of 200 to 1600 r.p.m. The shifting of the armature which produces the speed changes is accomplished by a small motor mounted on top of the large driving motor and connected to the shifting mechanism through sprockets and a chain. For adjusting the speed, the operator simply presses the fast or slow button of the small speed control station A, Fig. 1, which is conveniently located at the front of each head. To insure the proper speed being used to give the best results for each job, the maker's speed dial, which was illustrated in *The Iron Age*, February 7, 1912, is used. This dial B has two scales, the upper graduated to show cutting speeds in feet per minute and the lower one the various sizes of drills. The dial is first set for the cutting speed desired by small knurl on the front of the case and the speed of the motor is then adjusted until the pointer is opposite the size of drill to be used. The starting and stopping of the motor are controlled through automatic starters operated by push buttons C which are also conveniently located at the front of each head.

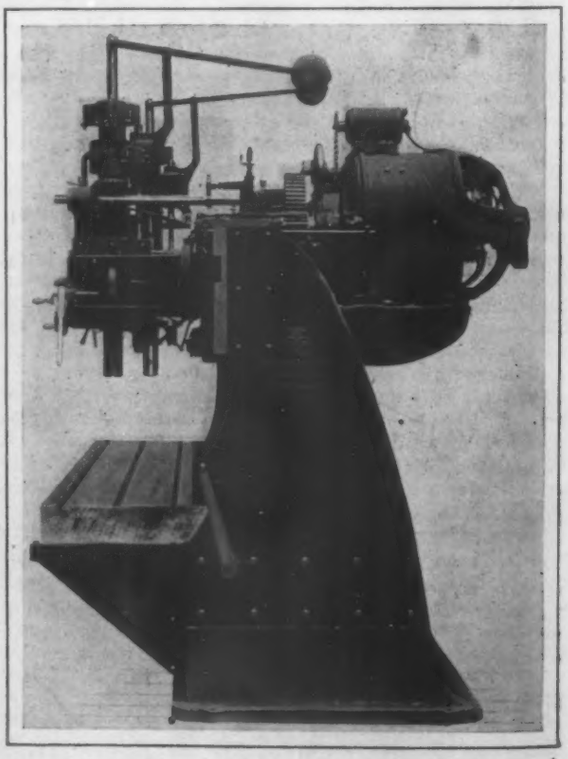


Fig. 2—An End View of the Machine Showing the Method of Mounting the Motor

The following table gives the principal dimensions and specifications of the tool:

Clear space between housings, in.	172
Maximum distance between spindle nose and top of table, in.	21½
Length of power feed, in.	12
Maximum distance between spindle centers, ft.	10
Minimum distance between spindle centers, in.	18
Minimum spindle speed, r.p.m.	37
Maximum spindle speed, r.p.m.	347
Diameter of driving end of spindle, in.	2¼
Diameter of spindle in sleeve, in.	2¾
Diameter of spindle nose, in.	3 19/32
Morse taper of spindle nose	No. 5
Diameter of drive shaft, in.	1¾
Working surface of table, in.	172 x 24
Width of crossrail, in.	10
Hight of crossrail, in.	20
Length of head saddle, in.	30
Bearing of head on rail, in.	12 x 14
Number of feed changes	3
Minimum feed per revolution of spindle, in.	0.006
Maximum feed per revolution of spindle, in.	0.020
Floor space required, in.	182½x48
Weight, lb.	28,000

The machine can be used for handling all classes of work for which it is adapted, the only change necessary being when it is operating on mud rings. When these are being drilled the brackets supporting the table are removed and special mud ring chucks are placed on the table which is run back between the housings. These brackets are doweled in position, which enables them to be removed or replaced readily.

Standardizing Flanged Fittings and Flanges

Unanimous Action Not Yet Taken by Manufacturers and Mechanical Engineers

The movement to effect a standard of flange fittings and flanges does not yet seem to have developed a unanimous agreement. Almost simultaneously have appeared two statements, one from the American Society of Mechanical Engineers and the other from the Committee of Manufacturers on Standardization of Fittings and Valves. Each is yet apparently standing by its guns, the one explaining at length the advantage of the 1912 U. S. standard recommended by the Mechanical Engineers and the other reporting the action of manufacturers at a meeting held July 10. An account was given last week of the hearing held in Washington under the auspices of a number of Government departments, and the communication referred to from the American Society of Mechanical Engineers, through Calvin W. Rice, secretary, states that the society's committee, after careful consideration, has decided not to reopen the subject, as had been erroneously reported.

Mr. Rice's statement is reproduced in elaboration of what has already been mentioned in these columns. It is in part as follows: The work of standardization was performed on request and "the changes have been made for engineering reasons. They refer particularly to heavy work and to the sizes above 9 in. The above being true, these changes would affect principally the large consumers of great responsibility where safety is essential and where no expense would be considered too great which would prevent accident and secure continuity of service.

Standard Weight Flanges

"In comparing the 1912 U. S. schedule of standard weight flanges with the alternative standard submitted by the sub-committee of manufacturers with respect to diameter of bolt circle, number of bolts and diameter of bolt holes, we find they are identical, with the one exception that the U. S. standard gives ⅞ in. instead of ¾ in. for diameter of bolt hole for 4-in. pipe. Comparing the proposed manufacturers' standard with British standard pipe flanges for working steam pressures of 225 lb. per square inch, we find the British standards give higher values, especially as number of bolts are concerned.

Extra Heavy Flanges

"For extra heavy flanges up to 9 in. inclusive, the 1912 U. S. standard and the standard of most manufacturers are identical. Above 9 in. the U. S. standard is somewhat larger than the present standards, as has been stated. With the British standard, the diameter of bolt circle and number of bolts are the same for pipes corresponding to the 1912 U. S. standard or proposed manufacturers' standard weight and extra heavy weight, but from 10 in. on the diameter of the bolt circle is from ¼ to ½ in. less than the proposed manufacturers' standard and ¾ in. less than the U. S. standard. The number of bolts in most cases for pipes from 10 in. on in the U. S. 1912 and manufacturers' is from two to four bolts greater than in the British standard. As far as size of bolts is concerned, the British standard makes a distinction between pipes for pressures up to 225 lb. and up to 325 lb. The bolts for pipes up to 225 lb. are below the manufacturers' standard ⅛ in. in nearly every case and below the U. S. standard from ⅛ to ⅜ in. In pipes for pressure of 325 lb. the British standard is the same as the proposed manufacturers' schedule in all cases except 14 in. and 18 in., where the British standard is ⅛ in. larger than the manufacturers' standard, but from ⅛ to ¼ in. smaller than the U. S. standard.

"It is thus seen that wherever there is a distinction between the 1912 U. S. and proposed manufacturers' standard, the 1912 U. S. standard is invariably on the side of greater safety and strength and has the added feature of interchangeability where the proposed manufacturers' schedule has different face to face dimensions. As to the comparison with the British and German standards it must be remembered that they cover by one standard both weights of the American specifications, and as would be naturally expected with compromises must have higher values for standard weight pipes and lower values for extra heavy weight pipes. However, in Germany there is reported in the public press dissatisfaction with the existing standards as not being safe."

The Schedule Adopted by the Manufacturers

The meeting of the Committee on Standardization of Fittings and Valves, Carlisle Mason, chairman, and W. H. Douglas, secretary, was held July 10 at 30 Church street, New York. Mr. Douglas said that the manufacturers' 1912 schedule of flanged fittings and flanges was adopted to take effect October 1, 1912. "There was practically no opposition among the manufacturers present," he continued, "to the adoption of this schedule, but one vote being recorded against it. Copies of this schedule will be printed and distributed to the manufacturers and the trade generally as soon as possible."

New list prices for brass and iron body swing check valves, standard and extra heavy, were adopted at the meeting, to take effect October 1, 1912, copies to be printed and distributed to the trade as promptly as possible.

Electric Properties Company Reorganized

At a meeting of the Electric Properties Company, control of which was recently acquired by a syndicate composed of the Westinghouse Electric & Mfg. Company, the Equitable Trust Company, Stone & Webster and William Morris Imbrie & Co., a reorganization of the board was effected. Alvin W. Krech, Henry R. Hayes, A. Ludlow Kramer and Guy E. Tripp were added to the board, the last named being chairman of the Westinghouse Electric & Mfg. Company. Other directors are James Imbrie, Paul D. Cravath, John Deager, John F. Wallace, F. Q. Brown, Charles H. Allen, H. H. Westinghouse, of New York; George Westinghouse, T. L. Brown, H. M. Brackenridge, J. R. McGinley, of Pittsburgh; E. G. Tillotson, of Cleveland; Horace E. Smith, Philadelphia, and Homer Loring, Boston.

John F. Wallace, president of the Electric Properties Company and of Westinghouse, Church, Kerr & Co., will be chairman of the board of directors. He will have general supervision of the affairs of the corporation and active direction of Westinghouse, Church, Kerr & Co., all of whose stock is owned by the Electric Properties Company. The stock of the last named company outstanding is $3,920,000 preferred and $6,000,000 common. The contracts now on the books of Westinghouse, Church, Kerr & Co. are the largest in volume in its history. This work includes a $2,500,000 shop plant for the Canadian Pacific at Calgary, the reconstruction of the Canadian Pacific terminals at Vancouver and shop and industrial plants for important railroad and industrial interests in the United States. It also has under way a number of hydroelectric and interurban railroad projects.

Gas Engine Driven Air Compressors

In addition to the motor-driven portable air compressor which was illustrated in *The Iron Age*, June 27, 1912, the Gardner Governor Company, Station A, Quincy, Ill., is also building a line of gas engine driven air compressors.

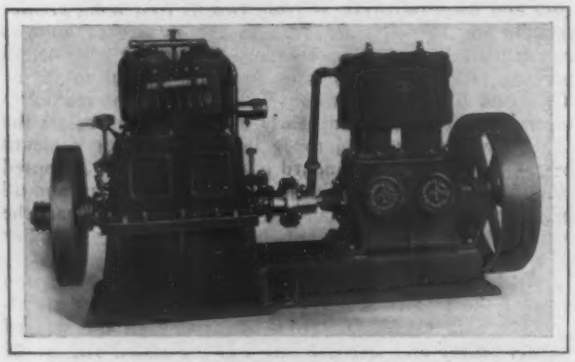


Fig. 1—Gas Engine Driven Air Compressor Outfit Built by the Gardner Governor Company, Quincy, Ill.

These consist of a vertical Gardner-Rix high speed air compressor connected to a gas engine either directly or through a belt connection. These units are furnished in both stationary and portable styles, the former being illustrated in Fig. 1 while one of the portable units is shown in Fig. 2.

The outfit illustrated in Fig. 1 consists of a 6 x 6 in. class H duplex compressor directly connected to a vertical gasoline engine. Both of these are mounted on one common bedplate which gives a compact and light unit. Among the advantages claimed for the compressor are, the use of few parts, freedom from outside adjustments, simplicity of construction and the requiring of but little attention to keep it in good working order. It is emphasized that the freedom from intricate mechanisms requiring delicate adjustments make it a valuable compressor for use in places where the best care and attention are not always available. The compressor is of the inclosed type and is dirt and dust proof and is capable of being operated at high speed. This feature is possible for several reasons, among these are the use of a special type of valve, large valve openings and air passages, automatic lubrication and the use of a trunk piston. The valves instead of being of the poppet type or heavy flat valves are very light. Tempered sheet steel not over 1/50 in. in thickness is used and it is emphasized that in this way the continual seating causes no wear on the cylinder or piston. By making the valve areas large and the air passages of ample proportions it is pointed out there are no cramped openings and as a result friction is eliminated.

The lubrication system is automatic and uses a combination of grease and oil. It is emphasized that every part subject to wear is given a good supply of lubricant and as a result the bearings run cool and do not wear rapidly. Compression cups on the connecting rod are employed and aside from these there is no necessity for lubricators, grease or oil cups.

The piston is of the trunk type and as a result the cross-heads and stuffing boxes are entirely eliminated and there are no stuffing boxes to pack or cross-heads to key up. The connecting rod and the main bearings are all fitted with interchangeable die cast bushings which are easily renewable. When these become worn no rebabbitting is necessary as all that has to be done is to slip out the old bearings and insert new ones.

One of the special advantages claimed for the portable outfit shown in Fig. 2 is that the weight is very light. This outfit consists of a steel truck on which is mounted an 8 x 6 in. class G compressor belt driven from a 10-hp. gas engine. In this unit the air receiver is mounted on the truck and all the connections are made.

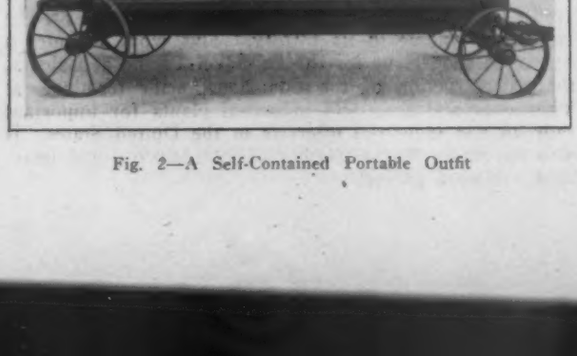


Fig. 2—A Self-Contained Portable Outfit

Customs Decisions

Watchman's Clock Movements and Cases

The Board of United States General Appraisers has overruled protests filed by the Chicago Watchman's Clock Works. Duty was assessed on the movements and the cases of watchman's time detectors separately. It was claimed that duty should only have been levied on the movements at the specific rate and that no duty should have been collected on the cases.

Importance of Precise Description of Invoice

The decision of the collector at Chicago was also affirmed in regard to the protest of the Universal Shipping Company. Aluminum was assessed at 11 cents per pound under paragraph 172 of the present tariff act as "aluminum in sheets." The goods were invoiced as "aluminum sheet" and the report of the local appraiser referred to it as "aluminum in the form of sheets and circles or disks." The witness for the importers had not seen the goods, but testified from the invoice description that the invoice specifications covered aluminum in sheet form as well as aluminum in long strips. As the proof as to the exact form of aluminum that was really imported was so unsatisfactory the board found they were unable to base a proper finding of fact thereon, and accordingly the protestant's claim of 45 per cent. ad valorem as "manufactures of aluminum not specially provided for" was overruled.

Lacquered Tin Boxes as Containers

Regarding an importation of lacquered tin boxes used as containers of paints, B. Illfelder & Co. protested against the assessment of duty at 4 cents per pound and 35 per cent. ad valorem under the provisions of paragraph 195 of the tariff act of 1909, claiming that the metal boxes were properly dutiable at the rate applicable to the paints. Following a previous ruling of the United States Court of Customs Appeals, in which the same importers were the litigants, the board affirmed the collector's levy of duties. On the authority of the same decision the protests of the American Shipping Company and Wakem & McLaughlin were overruled, the lacquered metal cases in this instance however, holding smoking tobacco. The goods were assessed at 55 per cent. and were claimed free of duty as the usual and ordinary coverings for the contained merchandise.

Thumb Tacks

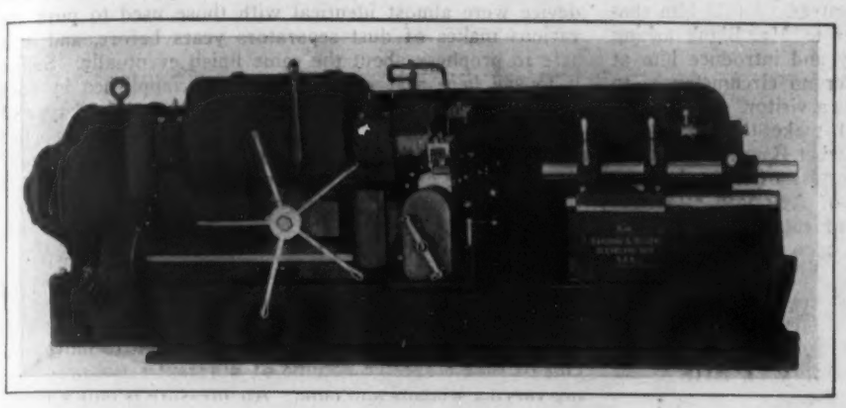
The decision of the collector was affirmed in the case of Flowers, Anderson & Co., of Chicago, who imported thumb tacks of the kind used by artists and architects for the purpose of fastening designs and drawings to boards or tables. Duty was assessed at the rate of 45 per cent. ad valorem and the claim was made that the goods were properly dutiable as "cut tacks, brads or springs" under the provisions of paragraph 163. In accordance with a previous decision the protest was overruled.

The Interstate Commerce Commission has decided that rates from the South to New Albany, Ind., must be made the same as those to Louisville, Ky., across the Ohio River from New Albany. The decision is a victory for the Merchants & Manufacturers' Association of New Albany, which includes in its membership the American Automobile Mfg. Company, the Anchor Stove & Range Company, the American Hame Mfg. Company, Gohmann Bros. & Kahler, the New Albany Mfg. Company and others.

The Diesel engine sea-going vessel Selandia, according to W. I. Knudsen in a paper before the Royal Society of Arts, London, required only 0.363 lb. of coal per indicated horsepower, including auxiliaries.

Motor-Driven Cutting-Off Machine

Among the special features claimed for the 6-in. motor-driven cutting-off machine built by Bardons and Oliver, Cleveland, Ohio, are rapid and efficient operation, the consumption of a minimum amount of time in placing and replacing stock, ample facilities for chip removal and lubrication and a rigid and compact construction. The machine is driven by a Westinghouse type SA, 15-hp. adjustable-speed motor and in conjunction with a geared head, spindle speeds ranging from 20 to 152 r.p.m. are available. Another feature of particular interest is the design of the cutting-off tool slides.



A 6-In. Cutting-off Machine Equipped with Westinghouse Motor Drive Built by Bardons & Oliver, Cleveland, Ohio

The wide speed range mentioned in the previous paragraph enables the most economical cutting speed to suit the type of tool used to be obtained at all times. These speeds range from 20 to 152 r.p.m. per minute, the increments being 10 per cent. each. This range is obtained by the geared head of the machine and the use of an adjustable-speed motor having a range of from 300 to 1200 r.p.m. and operated in connection with a drum controller having 16 points. In this way there is ample power, it is pointed out, to take care of the full capacity of the tool and the motor drive makes the machine an independent unit which can be placed in any position in a shop to suit the system of routing material.

The automatic chuck, the adjustable stop for the stock and the drum controller reduce the time of placing and removing the stock to a minimum. The support for the cutting-off tool slides is fastened to the front of the head which is widened on each side for this purpose. This support or bracket has openings between the slides and the head allowing the chips to fall directly into the pan without interfering in any way with the operation of the slides. Another advantage of this arrangement is that it also permits the shortening of the main bed and leaves an open space under and to the right of the cutting-off tool slide to facilitate the removal of the chips. This arrangement does away with the trouble frequently encountered of having chips catch and interfere with the operation of the tool.

The following table gives the principal dimensions and specifications of the machine:

Capacity of automatic chuck, in.	6
Diameter of hole through chuck plunger, in.	6⅛
Diameter of hole through spindle, in.	7 1/16
Diameter of front spindle bearing, in.	9¼
Length of front spindle bearing, in.	8
Diameter of rear spindle bearing, in.	8⅛
Length of rear spindle bearing, in.	6¾
Size of cutting-off tools, in.	⅝ x 2½
Minimum spindle speed, r.p.m.	20
Maximum spindle speed, r.p.m.	152
Power required, hp.	15
Minimum speed of driving motor, r.p.m.	300
Maximum speed of motor, r.p.m.	1,200
Floor space, ft.	5½ x 14
Weight, including motor, lb.	16,000

An ample supply of cooling oil is furnished to the cutting tools by an oil pump, an arrangement which gives a corresponding increase in their capacity. The waste of this oil is reduced to a minimum by the use of a pan to catch the oil as it falls from the tools after being used.

The blowing out of one of the Rogers-Brown Iron Company's new Susquehanna furnaces at Buffalo leaves two furnaces of this group in blast. The second new one will probably go in soon.

The Open Shop

Suggestion That American Plants Should Not Be So Unreservedly Accessible to Foreign Visitors

BY DR. ROBERT GRIMSHAW

This communication has nothing to do with trades unions. It refers to the question of shop visitors and might more properly be entitled "The Open Door"; but that again would lead my readers to suspect that I was going to talk about Morocco and Algeciras, and perhaps even enlarge upon the Monroe Doctrine. If again I had very oppositely entitled it "Reciprocity" I would have been in exactly the same fix. So I will let the title stand and tell what it is about, as did the small boy who wrote under the picture he had just drawn: "This is a horse."

As is well known, nearly every machine shop proprietor in America not only permits but welcomes visitors, even when they belong to rival establishments. And when European visitors come to America they are accorded, if anything, better treatment in this particular than Americans—partly out of the idea that their competition could not be so directly felt and partly out of hospitality in general (on the same principle that the German Kaiser was allowed to inspect the "innards" of an American warship on his own personal request, although such request was contrary to all etiquette in such matters).

I think, however, that it is time that this permission be restricted, at least as far as concerns foreign visitors, who are by no means willing to accord similar favors on request much less to offer them. At present the thing is too much like a jug handle—all on one side.

There are at least two reasons for such refusal on their part. One is that the manufacturers in question are conscious of the fact that what the visitor would see would not impress him very favorably in comparison with what he had seen elsewhere. The other is downright selfishness. I know that in this matter of "Visitors Welcome" we are laughed at by those who have been accorded all the courtesies that they have requested—and who have abused them.

A Thwarted Visit by Stealth

In this latter connection I will give an example out of my own personal knowledge. A member of one of the sections of the German engineers' society gave in open meeting some time ago an account of how he visited one of the Carnegie works—I think it was Homestead—and presenting his card as a member of the society in question asked permission to see the works. He was informed that unfortunately the guide, whose pleasant duty it was to show visitors about and explain things to them, had gone ahead about half an hour before with a party and it would probably be hard to find him, but that the visitor was at full liberty to wander about and see things and learn as much as he could for himself, with this single exception, that the armor plate department was not included in the permission to visit. Left to himself he made tracks for the forbidden department, over the door of which the sign "No Admittance" was quite conspicuous—and as he said perfectly understood by him—and went in. He was very promptly met by a detective with a club and ordered out. He left, but went around the building to the back entrance. Here there was plainly to be seen the same sign, "No Admittance." Unheeding this, he went in again, but was again promptly met by another detective with, presumably, another club, and who ordered him out again. As he thought he knew about how many times it was safe to go into a building infested with detectives armed with clubs, he "stood not upon the order of his going, but went at once."

Many members of the society who heard this story at the meeting thought it funny. But with my half-Quaker bringing up I see very little difference between this sort of thing and going into a man's office to wait for him and

taking advantage of his absence to open his letter files or peep into his account books. I give the name of this engineer to the editor.

A Bald Plan to Learn Secrets

Some years ago the son of a prominent German pump manufacturer whom I and my family knew very well socially stated his intention of making a "Studienreise" in America and asked me for a letter of introduction to a given pump company asking permission for him to work in the shops without pay as a volunteer. I told him that I would give him a personal letter to Mr. Blank asking the latter to treat him well socially and introduce him at the —— Hunt Club, etc., but under no circumstances to allow him to enter the shops, even as a visitor.

In the interest of reciprocity I make the suggestion that an effort be made to ascertain what German manufacturers are willing to extend the courtesy of their shops to properly accredited representatives of American establishments and to restrict the freedom of entry in America to those Europeans who believe in the open shop in the sense in which I have written above.

Removal of Refuse by Fans*

Suggestions on Laying Out and Proportioning a System for Handling Manufacturing Wastes

BY F. R. STILL†

The removal of waste material from machines in industrial plants by means of fans or blowers has been in general use for over 70 years. It is the most efficient and satisfactory method known; yet even now the minimum velocity or volume of air required to convey substances of varying specific volumes and densities is not known to any definite extent. Naturally little was known about the proper design and proportion of hoods, so considerable confusion existed for years as to the proper pipe sizes. But in due course of time a standard size of pipe was generally adopted for a given duty on a machine of a certain type and capacity, and these sizes have become almost universal.

Early Methods of Designing Dust Removal Systems

The way these sizes were arrived at was very crude. In those days (and even by some at the present time) it was generally supposed that the pressure pushed the stuff along. Nobody thought it was the velocity, and even if they had thought of it, they had no known method of measuring the velocity as an anemometer would be quickly destroyed at such high velocities. The Pitot tube for measuring velocity was not generally understood, and, in fact, it is only within the last five years that it has been developed to an extent that makes it an accurate or dependable instrument of measurement.

Hence experimenters would put up a system of pipes, add the areas of the branches together to determine the size of fan inlet and then try the fan at varying speeds, try different shapes and proportions of the hoods, etc., until the system seemed to work all right. Probably the very next job would fail to work because the piping system was more extensive or the outlet from the shaving vault was too small, thus causing undue back pressure or some other of the many things which can happen around such plants. The first thing always resorted to was to "speed up the fan." If it worked it was "a fine job." If, however, that did not prove effective, then the remote sections of the main pipe were taken down, the larger pipe moved along and supplanted by still larger pipe near the fan, a larger fan installed and larger branches to those machines which did not seem to have enough "draw" to them. After several similar experiences by the different builders of such equipment, they all gradually arrived at one standard size of branch pipe for a certain duty and these sizes have been quite closely adhered to down to the present time.

About the time the general form of hoods and pipe sizes had been standardized, considerable stir was created by inventors of "dust arrestors" or "dust separators" or "dust collectors," as they are variously known by different makers. These were used to trade on for many years, most extravagant claims being made for some of them and the prospective purchaser was often in a perfect maze of claims, guarantees, contradictions and threats. This, by the way, has not entirely subsided yet, though less attention is paid to it now.

Later a new angle to the business was introduced by means of the euphonious words, "low speed and low power fans." The methods pursued in the introduction of this device were almost identical with those used to push the various makes of dust separators years before, and it is safe to prophesy about the same finish eventually. Suffice it to say here that nothing can be accomplished by such fans that cannot be accomplished by any standard type of exhaust fan with even less power when properly applied than the former requires. This name has proved a good thing to trade on and is now being pushed to the limit, but the people will eventually learn there is nothing in it.

Velocity and Volume of Air Moved

Investigations and experiments should first determine what velocity is required to move different substances of varying weights and bulk. Then should be determined what proportionate volume of air is required to move in a unit of time a specific volume of different substances having varying weights and bulk. Air pressure is only a measure of velocity and resistance, beyond which it has nothing to do with the moving of material, as many suppose.

The relative area of a substance has a great deal to do with the ease with which it can be moved by air. For instance, a comparatively low velocity will move a cubic foot of powdered coal which will pass through a 100-mesh wire screen. It will take double the velocity to move a cubic foot of coal which will pass through a 25-mesh screen. But a centrifugal fan cannot produce high enough velocity to move a cubic foot of coal in a solid block.

The same is true of many other substances; take for instance shavings and dust from planing mill machinery. Twenty feet per second will move the lighter dust; 40 ft. will move the shavings; 50 ft. will move the sawdust, but there are knots, blocks, etc., which also have to be taken care of, and these sometimes require 60 ft. or more per second. Hence the velocity has to be selected which will take care of the largest and heaviest pieces likely to enter the system.

From this it will readily be seen how essential it is for economical operation to know what is the lowest velocity required to move a given substance, as the frictional loss multiplies directly as the square of, and the power to drive the fan directly as the cube of the velocity. For example, if only 40 ft. per second is necessary and 80 ft. is provided and at the lower velocity it requires 25 hp., it would require 200 hp. at the higher speed. This is not an absurd comparison, as many are the plants where just such a comparative waste of power is taking place.

Frequently the velocity as predetermined may be correct, but the volume of air for the volume of material to be handled in a given unit of time may be sufficient. In other words, the ducts are too small. Hence the fan has to be speeded up to create a higher velocity in order to move the requisite volume of air. This has exactly the same effect on the power as would the velocity if it had been figured too high at first. An example of this latter character came under observation about a year ago, in one of the largest mills in the South. Six very large double exhaust fans were installed, driven by direct-connected electric motors. The planing mill machines are all high speed, having three or four times the surfacing speed of the older types; hence there is proportionately a greater volume of refuse to handle. The pipes attached to the hoods on the machines, being about the standard size, failed to take care of the refuse properly. The owners, having lost confidence in the contractor who installed the plant, sent in the plans with a request that they be advised as to the best course to pursue to put the plant in a condition which would be satisfactory to them.

A careful analysis of the situation showed it would require 438 hp. additional to do the work with the existing plant by speeding it up; whereas, by revising the plant on a larger scale, proportionate to the work to be done, it would require 156 hp. additional. Hence the saving would be 282 hp. by changing the plant over. At the conserva-

*From a paper read before the American Society of Heating and Ventilating Engineers, Detroit, Mich., July 12.

†Secretary, American Blower Company, Detroit.

tive figure of $40 per horsepower per annum, this would indicate a saving of $11,280, which, at 5 per cent., would represent the interest on an investment of $225,000. The owners of this plant have spent thousands of dollars experimenting on processes to utilize the waste from this mill for making various by-products, some of which have great value; hence they are more conservative about the consumption of refuse for fuel than are many others in a similar line of work.

Table I, gives the standard diameters to attach to the hoods enclosing the knives and saws of ordinary machines.

Table 1. Sizes of Pipes for Planing Mill Machinery.

Upper Cylinder. Length of Knives.	Diameter of Pipe.	Lower Cylinder. Length of Knives.	Diameter of Pipe.
5 inches.	4 inches.	5 inches.	4 inches.
10 "	5 "	10 "	5 "
14 "	6 "	14 "	5 "
24 "	7 "	24 "	6 "
30 "	7 "	30 "	7 "

	Diameter of Pipe, in.
Matcher heads, each	5
Sash and Cabinet Shaper, each head	4
Door Tenoner	5
Sash Tenoner	4
Door and sash sticker, each head	4
Blind slat sticker	4
Blind rail router	4
Panel raiser, each head	4
Sand Drum, 24 in. long	4
Sand Drum, 30 in. long	5
Mortiser, floor spout	6
Floor sweep-up	6
Rip-saw and re-saws	
10 to 16 in. diam	4
18 to 24 in. diam	5
42 to 60 in. diam	6
Cut-off and grooving saws	
10 to 16 in. diam	4
18 to 24 in. diam	5
Band saws, small	3

Moulders, buzz planers, pony planers, diagonal planers, jointers and all other machines having knives or saws of dimensions given will require pipes of their respective diameters. Timber planers require 25 per cent. larger pipes than ordinary planers. High speed planers and matchers require about 50 per cent. more area than is indicated in above table.

The Wisdom of Selecting a Large Fan

If the fan selected is a size or two larger than the sum of the areas would indicate, it will do the work when running at a very much slower speed, and will require less power. For example, supposing the plant requires a 12-in. main, which with the branches and separator offers a resistance of, say, 4¾-in. water gauge. If a fan having a 12-in. inlet should be attached it would have to run at about 1865 r.p.m., requiring 5⅞ hp.; whereas, if a fan having an 18-in. inlet were attached to produce the same velocity, it would only have to run at 1040 r.p.m., requiring 5¼ hp. Thus the speed would be reduced 44 per cent. and the power reduced more than 10 per cent.

The Special Requirements of Hoods

Hoods are never carried in stock by anybody, there being such a variety of makes and sizes of machines as to preclude the possibility of making a standard to fit one make of machine that will fit any other make. A governing principle for the design of hoods is to so shape them that the refuse from the knives or saws is shown directly to a point where it will be caught by the highest velocity of the air.

The hood over the upper knives on a surfacer has a mouth at the bottom several times the area of the pipe; consequently it has very little lifting power at the mouth. Immediately above the apron around the knives the hood is drawn in from all four sides so as to reduce the area to about equal the pipe area; it is also drawn back at a considerable angle in the direction the shavings fly from the knives. Thus the shavings fly at once into the contracted area, where the velocity is the highest and, being once set in motion, it is easy to keep them moving.

The hood to the bottom knives is not much more than a shallow hopper with a narrow slit at the bottom leading into a horizontal pipe. The end of the pipe is usually left open to prevent clogging up, as otherwise if the shavings should bridge over the opening in the bottom of the hopper it would shut off all circulation and the pipe would then become dead until cleaned out. The hoods to the side heads are sometimes very complex in form, but the same principles are employed in their design as for the upper hoods.

Branches and Elbows to Pipes

Where the branch pipes attach to the main they should enter at an angle of not more than 45 deg., and 30 deg. or less is better. Never attach a branch at right angles to the main. Two branches should never enter the main directly opposite each other; also avoid the use of Y-branches, as the two currents in conflict retard the flow, sometimes causing the pipes to clog.

Elbows should have a radius in the throat twice the diameter of the pipe. For example, a 6-in. pipe should have a radius of 12 in. in the throat. There is no advantage in making the radius more than twice the diameter.

A right angle elbow in a 6-in. pipe offers as much resistance as a straight pipe of the same diameter 44 ft. long.

With a radius of half the diameter, it is equal to a straight pipe 15 ft. long.

With a radius of one diameter it is equal to a straight pipe 5½ ft. long.

With a radius of two diameters, it is equal to a straight pipe 2¼ ft. long.

By making the radius more than twice, the resistance begins to increase again until at six diameters it is equal to a straight pipe 3 ft. long. This is due to the greater distance the air is under compression on one side of the pipe while making the turn.

Friction of the air traveling through the pipes is another and very essential point for consideration, and it must be determined in order to know the minimum speed at which the fan can be run. Careful experiments have shown that a length of round pipe from 62 to 72 times its diameter will produce friction equivalent to the velocity head, the shorter length applying to small pipes, because of the relatively greater resistance the roughness of the surface presents per unit of volume. In actual practice it is customary to allow about 40 diameters, to compensate for branch tees, reducers, dents, etc. The refuse carried along by the air also increases the resistance somewhat.

Rectangular pipes can be compared with round pipes by multiplying the area of the square pipe by four and dividing by the perimeter of the square pipe; the result is the corresponding diameter of a round pipe for the same velocity.

The friction for varying diameters of round pipes is inversely proportional to their diameters, at a given velocity.

The friction of rectangular pipes at the same velocity varies inversely as the square root of their respective areas.

The friction of any pipe is directly proportional to its length.

Hoods for Smoke and Gases

In the application of fans to the removal of smoke, fumes, fine dust, obnoxious gases, etc., great care has to be exercised in so designing the hoods that they will not interfere with the process, that they will not be in the way of the mechanics and still be capable of catching the floating material before it gets into the room. Most failures in such installations are due to the pipes being too small.

For example, supposing a hood of conical form is 3 ft. in diameter at the mouth with a 7-in. pipe attached at the top. With a velocity of 4000 ft. per min. in the 7-in. pipe, the velocity is only 151 ft. at the mouth, or less, about 2.5 ft. per second.

A very efficient though somewhat expensive hood of this type is to put one hood inside the other, leaving about ⅜ in. space between all around the bottom, and then run a nozzle from the apex of the inner cone up into the pipe which is attached to the outer cone. The nozzle should be about half the area of the pipe. With such a hood anything that rises up into it cannot escape around the rim even if it is not drawn off by the central connection.

A common rough rule for determining the diameter of pipe for round conical hoods is to make the bell-mouth 1 ft. larger in diameter than the apparatus it is to cover and increase this diameter 1 ft. for every 2 ft. elevation above 2 ft.; then to make the pipe one-sixth the final diameter of the mouth as thus determined. For instance, a kettle 2.5 ft. in diameter, having the bottom of the hood 2 ft. above it, would have a hood 3.5 ft. in diameter or 42 in.; the pipe would be one-sixth of this or 7 in. diameter.

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CONTENTS.

Vitality of the Wire Industry

The ability of the wire trade to forge ahead, even when demand for other forms of finished steel falls away, is again indicated by the statistics for 1911 which are published this week. While the full production returns from all branches of the steel industry are not yet available, the figures show that a new record was made last year in wire rod production at 2,450,453 gross tons, against 2,241,830 tons in 1910 and 2,335,685 tons in 1909. With the possible exception of tin plates, other lines of finished steel fell off from the figures for 1910, as indicated by an output of 23,029,479 tons and 25,154,087 tons of steel ingots in 1910 and 1911 respectively. We have commented before on the exceptional way in which the manufacturers of wire products have extended their markets under conditions generally operating to cut down steel consumption, but the performance of 1911 is especially noteworthy. What was said about the industry in 1910, when plans were under way to add considerably to wire mill capacity was more by way of suggesting the probable effect on prices. There was the intimation that the previous rapid growth of the industry might not be maintained and that some who were entering upon wire manufacture had not taken account of the extent to which concrete in replacing wood was cutting down the use of wire nails.

What happened in the market for wire products last year bore out fully all that had been suggested as to the effect of new competition on prices. No other branch of the trade suffered more in this respect, unless it were sheets, and from the standpoint of profits the results of the year's business were in sharp contrast with the record for tonnage. There is no doubt, however, that the old economic law of the stimulation of consumption by low prices was operating, and to an extent it was undoubtedly true that the crowding of product on the market from new sources added to the sum total of its use. It has been seen repeatedly that the necessity of opening up new uses for finished steel has been a very prompt contributor to tonnage. Particulars are not at hand as to the lines this extension of the wire market followed last year. Exports increased in this as in other branches of the trade, being 306,017 for wire rods and all manufactured forms, against 237,667 tons in 1910. The use of wire mesh in construction work undoubtedly increased, as did the innumerable uses of wire specialties, in which the aggregate is a constant marvel, considering how tenuous are the gauges of wire so employed.

By way of fresh emphasis on the important place in tonnage taken by wire products, because of their widely ramifying uses, we set down below the figures for the production of wire rods, structural steel and rails in the past four years. The comparison is interesting:

Production of Wire Rods, Structural Shapes and Steel Rails, Gross Tons.

	1908.	1909.	1910.	1911.
Wire rods	1,816,949	2,335,685	2,241,830	2,450,453
Structural steel ..	1,083,181	2,275,562	2,266,890	1,912,367
Steel rails	1,921,015	3,023,845	3,636,031	2,822,790

It will be seen that last year wire rod production was more than one-half that of structural steel and rails combined. The total of wire rods for 1909 and 1910 was more than the total of structural material for those two years, and last year wire rods exceeded structural material, which in popular thinking is so

large a factor in steel consumption, by more than 500,000 tons. A feature of the table is the close approach of wire rod output to that of steel rails in years when railroad buying falls off, as in 1908 and 1911. This fact furnished one of the strongest reasons for the selection of wire products as an outlet by steel manufacturers who were seeking to provide against the very marked fluctuations in railroad demand.

The Call for Special Automatic Machines

The demand for special automatic machinery of all descriptions, including the varied types which fashion metal into thousands of forms, by itself or in combination with other materials, for the everyday use of the community, has increased at a rapid rate in recent years, and it promises to reach much larger proportions. The constant effort to attain the most efficient industrial methods is an important element in creating this condition. Manufacturers are striving harder and with greater intelligence to decrease the cost of their product. The great change which has come over labor, with its decrease in average skill, is another conspicuous influence. The builders of special automatics have been continuously busy above the average of the machinery business for several years. At the present time one company, probably the largest producer of its class of equipment in the world, is compelled to run its plant 23 hours a day in order to keep up with its orders.

The special machinery interests express profound satisfaction over the financial condition of the many industrial houses with which they come in contact. They find credits absolutely sound, a great majority of the concerns using their machinery having ample means with which to go ahead with improvements. Naturally when business is dull users of such special machinery are more willing to prepare for increased production than are those who require only standard machines; their orders require longer for filling, as a rule. They are, however, no better able financially to improve their equipment than are manufacturers in other branches of the metal working industry. The latter represent a tremendous buying force which should be felt in the near future.

The Replacement of Machine Tools

Some users of machine tools are content with their equipment because with it they are making a success of their business. They fail in this respect—that while they are making money they should be making more. In some cases they are successful in spite of the machinery used in their manufacturing departments. The designing and sales departments may be so very efficient that the demand for the product at profitable prices is large. The shop management and the efficiency department may be making the most out of the tools that do the work. With the same personnel, improved equipment would produce far greater results, insuring a more rapid growth and a firmer hold on the market of the future. It may be that only one weak link in the manufacturing chain needs strengthening, perhaps by means of the decreased cost resulting from better machinery in one department. The best of modern machinery, selected carefully to meet the requirements, will yield returns on the investment beyond any comparison with results from older machines.

Coupled with the products of the more progressive machine tool builders are advanced methods of using the machinery, as developed by specialists who have become highly trained efficiency engineers, at least as to their own product. This assistance is freely given the purchaser and is an important element in the replacement of old machines by new. Machinery salesmen often find successful manufacturers declining to investigate their claims regarding a machine or to permit a demonstration giving a comparison of existing production with what would follow the installation of the better equipment. To take such an attitude is a mistake. To continue long to make money modern conditions compel manufacturing departments to keep at least abreast of those of competitors.

Garden Spots in Working Places

In the large interior yard of a New England foundry, in the center of an area bare of verdure, surrounded by the usual piles of pig iron, scrap and flasks, with their backing of bare brick walls, is a great circular bed full of foliage and flowering plants. The effect is almost to startle the visitor, the contrast is so great. The garden is a striking illustration of the tendency to make the environment of the shop more and more attractive.

Good light and pure air and conditions sanitary in every way come first in putting into practice the theory that labor cannot be efficient where surroundings are not conducive to good health and good spirits. Partly for this reason manufacturing plants began to be moved from the city to the country, and it has been demonstrated that the reason is even more important than was at first supposed. The influence of restful scenes framed by shop windows rather tends to output than to lagging effort. For a kindred reason mill engineers are giving greater attention to the color schemes of the interiors of shops and factories.

The plant situated in the heart of a city manufacturing neighborhood is usually dreary enough. A touch of flowers and grass is keenly appreciated by many workmen, and, even though sub-consciously, by the great mass of employees.

New Publication

Farm Gas Engines, by H. R. Brate. Bound in cloth. Size, 5 x 7 in.; pages, 198; 37 illustrations. Price, $1.00. Published by the Gas Engine Publishing Company, Cincinnati, Ohio.

The author of this book has lived on a farm and has used and sold gasoline engines and the book is published as the result of his experience. One of its objects is to familiarize the users of gas engines with the principles of operation so that needless delay and expense might be avoided in a number of instances where the engine fails to work properly. With this object in view he has endeavored to present in a general way the action of the parts necessary for successful running of one of these engines and has as far as possible used simple language. Numerous examples of the different kinds of trouble met with are given and the text is supplemented by sketches to make it easier to comprehend and remember the particular points. Special attention is paid to the subjects of carburetion and ignition.

The Andrews Steel Company, Newport, Ky., manufacturer of open-hearth steel forging billets, slabs, ingots, blooms, sheet bars, etc., has appointed Frank R. Blaurock & Son, McCormick Building, Chicago, Ill., as its district sales agents in that territory.

Lake Superior Iron Mines

Menominee Range Properties with New Finds—The Hill Mines on the Mesaba

MARQUETTE, MICH., July 13, 1912.—Pickands, Mather & Co.'s Hemlock property at Amasa, Menominee range, has a new lease of life apparently as the result of recent developments. The bottommost level from which ore has been taken showed one of the best bodies ever opened in the Hemlock, both as to quality and quantity. A year ago the shaft was put down an additional 100 ft., only to bring indications that the deposit had petered out. Exploration by diamond drilling and drifting had been in progress ever since but without success until recently, when ore was found seventy ft. within the foot-wall. It is a characteristic of this formation, which is of greenstone, that it folds sharply and deeply, a fact which explains the periodical disappearance of the ore, but at no time had the fold been found as deep as revealed on this occasion. Much further work will be necessary to determine the value of the latest find. The indications, however, are flattering.

The United States Steel Corporation's Michigan mine in the Amasa region also has been given a new span of life as a result of exploratory work. Diamond drilling to the south of the old workings, which recently were closed for the time being, has shown the existence of a promising deposit. A shaft will be sunk to develop the find and, with the remainder of the ore taken out, the present mine probably will be abandoned.

Further to the south, in the Crystal Falls field, Corrigan, McKinney & Co. are employing a diamond drill in the underground workings of the Armenia mine. The ore measures at present developed have been rapidly narrowing of late months and the holes now being bored are expected to determine the future of the property. Corrigan, McKinney & Co. have two steam shovels at work at the Armenia, Dunn and Tobin mines and it is expected that most if not all of the ore in stock at these properties will be shipped this season. The big pile at the Great Western mine is still intact. Such of the properties of the Corrigan-McKinney Crystal Falls group as are in commission are all forwarding their daily hoist and the aggregate outgo is running well ahead of that of last year. The Bristol mine of Oglebay, Norton & Co. also is shipping briskly, as is the Hemlock. The Steel Corporation's Mansfield is doing but little, the apparent policy being to hold the ore in reserve.

To determine more fully the possibilities of a find made by the diamond drill, the Florence Iron company is preparing to sink an exploring shaft near the schoolhouse in the town of Commonwealth, in the Wisconsin portion of the Menominee range. The tract is two and one-half miles east of the company's Florence mine. It is intended to sink to a depth of 300 ft. and crosscut the formation from two levels. While the drilling has disclosed the existence of ore of good grade the extent of the deposit is problematical.

Not until well along in the coming year, it appears, will the Rogers property of the Rogers-Brown interests be ready to produce. No work is being done at present and it is understood the suspension ordered a few weeks ago will continue until winter. The Rogers shaft, which is of concrete for the distance it is sunk through the quicksand overburden, is still to reach the ore body. The deposit lies at a depth of 900 ft. It is of large proportions and with the mine developed the Rogers will be one of the most important producers in the Iron River district. Development work at the company's Chicagon property, midway between Iron River and Crystal Falls, Mich., continues.

Except that shipments are being made from the stockpile at the Imperial mine of the Cleveland-Cliffs Iron company and work on surface improvements is in progress at the same property, the Michigamme field of the Marquette range is inactive this season. The ore is of too low grade to warrant mining operations at present prices. Along with Michigamme, the village of Champion and the Dexter location are passing through a period of depression this summer. The Champion mine, owned in fee by the Steel Corporation, is idle, and at Dexter the Cleveland-Cliffs company's new Barnes property is out of commission until ore prices improve.

While the project has not been announced officially, it is the understanding on the Mesaba range that the Hill ore interests are making preparations for the development of a second large deposit. The property concerned is the Waubigon tract near Buhl. It is the intention to strip the deposit and it is said that bids for the work have been asked from various steam shovel contracting concerns. As reported at the time, the Hill interests already have awarded a contract for the removal of the overburden at a big property near Chisholm.

Corrigan, McKinney & Co. have two steam shovels at work at the St. Paul mine, at which operations recently were resumed. The property had been idle since 1907. The St. Paul is a new mine, having produced up to this time only 150,000 tons of ore, although its deposit is large and valuable. The pit is one of the deepest in the Mesaba region. The mines owned in fee by the state of Minnesota and wrought by various operating concerns under leases providing for the payment of royalties of 25 cents a ton are being worked briskly this season, for the most part, and are expected to practically double their shipments of a year ago. Ore is coming from the Grant, Cavour, Wacoutah, Fay, Scranton, Madeira, Seville, Hanna and Woodbridge and as much as 80,000 tons in the aggregate has been sent out in a single week.

The Stanley Committee Report

It is not yet determined how many reports will come from the Stanley committee, as the minority seems to be divided. The majority has left the preparation of its views largely to Chairman Stanley, who is quoted as saying that the committee will be more liable to agree on recommendations than on findings of fact. It is expected that the Tennessee Company's acquisition by the Steel Corporation will figure in an important way in the majority report and that the action of ex-President Roosevelt will be condemned. Chairman Stanley, it is understood, takes the position that the Steel Corporation is in restraint of trade and should be dissolved. It remains, however, for the courts to pass upon this important question; Congressman Stanley's views upon it have been well known for a long time. It is stated that the majority of the committee, with perhaps the concurrence of some members of the minority, will recommend legislation of the following character:

To divorce the industrial corporations from common carriers and to force the breaking of relations between the Steel Corporation and its subsidiary railroads.

To prohibit the organization of holding companies for industrial corporations.

To prohibit one industrial corporation from holding stock, directly or indirectly, in another corporation.

Jones & Laughlin Steel Company Advances Wages

Effective Tuesday, July 16, the Jones & Laughlin Steel Company, Pittsburgh, announced an advance in wages of common labor from 16 cents to 17½ cents per hour. The company also made a readjustment in hourly rates of labor to a higher basis, but no definite figures can be given, as nearly all cases that are affected by the advance are treated individually. These advances were entirely voluntary and affect more than 6,000 men.

New Open Hearth Capacity

The United States Steel Corporation's Finance Committee made a blanket appropriation this week for the building of additional open-hearth steel capacity at the Apollo works of the American Sheet & Tin Plate Company at Vandergrift, Pa. It has not yet been decided whether the new unit will consist of two, four or six furnaces.

The New York Evening Post notes that "there are four positions in copper, namely: The statistical position, which is much advertised; the psychological position, which is occupied by the consumer; the speculative position, which is said by all the bulls not to exist, and the real position, which apparently nobody knows."

Compensating Employees for Patents

General Features of Agreement Between Employer and Employee Selected by the National Metal Trades Association

Various plans have been adopted by manufacturers to encourage inventions by employees by the payment of some kind of bonus, premium or reward for ideas that are developed and patented. With the view of finding what its members were doing in the way of compensating employees for patented inventions, the National Metal Trades Association some time ago asked for information upon the subject. A number of replies were received from members giving different methods of rewarding employees for inventions. From the plans submitted the association has selected as a very satisfactory one the form of agreement which one of its members makes with employees.

Under the terms of this agreement employees will not, without the consent of the company or in accordance with another clause referred to below, sell any inventions to any one except the company. The employee agrees that should he, while in the company's employ, invent any mechanism or device he deems patentable he will at once notify the general manager of the company in writing, specifying the use of the invention or the functions which it is intended to perform, and he agrees without delay to describe and illustrate by sketches or otherwise as requested such improvements as he may so invent and to present such description to the company in such a manner and at such times as it may direct.

The agreement provides that within 90 days after such description has been made to its satisfaction the company shall cause such an examination as it sees fit to be made of the invention and if, upon examination, it desires to acquire the invention it shall notify the employee of its intention to do so. It shall then be the duty of the employee to make application for the United States letters patent under the direction of the company and to do all other things necessary to secure such invention by letters patent to the company, all expenses attending such application being borne by the company. On the execution of the application for the patent, the employee shall also make an assignment of it, if requested, to the company, and on the issuance of the patent the company agrees to make compensation to the employee as follows:

For all patents relating to the regular lines of manufacture of the company the employee is to be paid $50 as soon as the original letters of patent are placed in the hands of the company. For all patents made in fields not covered by the lines of manufacture the price is to be agreed on in each individual case. However, the company is given the right to purchase any patent at 75 per cent. of its value unless otherwise agreed.

The employee agrees to include in any application not only his principal invention but all such modification of such invention as he may have devised, provided the company thinks it is desirable to include such modifications in the application.

Acceptance by the company shall be in writing, and if not made within the time specified the employee may prosecute his application for the patent on his own account, provided, however, that after the expiration of 90 days he shall first give the company 30 days' notice in writing of his desire to make application upon his own account and shall accompany this notice with an outline in writing of the specifications and claims and sketches and drawings of his proposed application. If the company does not within 30 days elect to take the invention on the terms stated, the employee is released from the obligations to assign application to the company and may prosecute it in his own right and at his own expense and, of course, may sell it to other parties if he chooses.

The employee agrees that he will, on request, sign all papers necessary to procure the reissue of the patent on the invention which has become vested in the company. There is, of course, a provision to the effect that the contract does not affect the right of the company or of the employee to end employment.

Members of the association can secure copies of the agreement by addressing Robert Wuest, commissioner, New England Building, Cleveland, Ohio.

Standardizing Carbon Tool Steel*

A Suggested Classification According to Carbon Content and for Different Uses

BY HENRY OTTO†

On account of the many varieties of steel in the market it is rather a difficult matter for tool foremen to make a correct order to secure the real article needed for their various requirements. My idea would be to standardize the grades of steel and name them in a manner which would indicate the per cent. of carbon contained in each.

I believe if we would make about four classifications we would meet all the requirements for tools used in railroad shops, which should be as follows:

1—Should contain 0.65 to 0.75 per cent. carbon
2—Should contain 0.75 to 0.85 per cent. carbon
3—Should contain 0.85 to 0.95 per cent. carbon
4—Should contain 0.95 to 1.05 per cent. carbon

To be sure we get the per cent. of carbon in the steel we desire, steel received may be referred to our test department for analysis. Workmen not familiar with the per cent. of carbon contained in the steel cannot heat the steel with any uniformity in result.

With the grades that I have recommended we should heat and harden our steel to the temperatures here tabulated:

Heating for Forgings.

Grade No. 1 should be 1750 deg. F.
Grade No. 2 should be 1700 deg. F.
Grade No. 3 should be 1650 deg. F.
Grade No. 4 should be 1600 deg. F.

Heating for Hardening.

Grade No. 1 should be 1480 deg. F.
Grade No. 2 should be 1475 deg. F.
Grade No. 3 should be 1455 deg. F.
Grade No. 4 should be 1450 deg. F.

Heating for Annealing.

All grades from 1250 to 1300 deg. F.

Draw temper of all grades to suit character of work to be performed. As a matter of information I would suggest that the first grade of steel be adopted for use in making pick points, wrenches, pinchbars, crowbars, etc. The second grade to make smith tools, boilermaker tools, track tools, hammers, sledges, cold chisels, chisel bars, etc. The third grade to make general machine shop tools, counterbores, milling cutters, punching tools, rivet sets, shear blades, machine drills, etc. The fourth grade to make taps, dies, reamers, small machine shop tools, brass tools, etc.

Comments

C. A. COOK, master mechanic Chicago, Indianapolis & Louisville Railway Company, Lafayette, Ind.: I do not think it would be at all practical to use one standard of steel for the making of the various tools mentioned, but I believe it could be covered by two carbon numbers. For the reamers, taps, drills and thread cutting tools I find that about 0.90 to 1.00 per cent. carbon give the best results, but for rivet snaps and all tools with shanks on to be used in air tools, also punches, dies and shear blades, where they are subject to the shock and beating, a lower per cent. of carbon, say about 0.75 per cent., should be used. I find that I get the best results from tools we make by following those carbon percentages for the two different classes of small tools mentioned.

W. J. EDDY, inspector tools and machinery, Rock Island Lines, Chicago: The per cent. of carbon that should be used in tool steel for making taps and reamers should be 0.95 to 1.10; for punches and dies, 0.85 to 1.00; for rivet snaps, 0.65 to 0.80. The writer doubts very much whether tools containing shanks used in connection with air hammers should be used in the same class as shear blades. Shear blades should contain 0.90 to 1.00 per cent. carbon, and if rivet snaps are included in this list they should not contain so much carbon.

The Thomas Iron Company is planning to blow in Lock Ridge Furnace No. 8, at Alburtis, Pa., during the week. The stack has a capacity of about 50 tons of pig iron per day.

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*From a paper read before the Railway Tool Foremen, Chicago, July 11.

†Tool room foreman, Atchison, Topeka & Santa Fe Railway, Topeka, Kan.

The Iron and Metal Markets

An Advance in Sheet Prices

Also in Railroad Spikes, Rivets and Nuts and Bolts

Pending Car Inquiries Large—A Probable Advance in Wire Products

The chief developments of the week in the steel trade are an advance in prices of black and galvanized sheets, railroad spikes, and rivets, bolts and nuts, and a 10 per cent. increase in the wages of common labor by the Jones & Laughlin Steel Company.

The advance in sheets made by the American Sheet & Tin Plate Company is $2 a ton on black sheets or to 2.05c. per lb. for No. 28, $2 a ton on tin mill black plates or to 2c., and $3 a ton on galvanized sheets, or to 3.15c. for No. 28. The high price of spelter has forced a differential of 1.10c. between galvanized and black sheets, instead of the usual 1c. Independent sheet manufacturers may not all at once make the same advances as the leading interest, but all mills are so well employed that the new prices are likely to be established sooner than were those announced in April. The advance in spikes was $2 a ton. On large bolts the discounts were shortened 5 per cent. and on small bolts 2½ per cent.

The advance from 16 cents to 17½ cents an hour for common labor by the leading Pittsburgh independent company is to the basis that for some time has been paid by other important companies in that district. The action taken was in view of the loss of men to other kinds of employment. An advance of 10 per cent. was also made last week to some classes of labor at the Phoenix Iron Works, Phoenixville, Pa.

The output of steel works and rolling mills has been somewhat cut down by hot weather, but not enough to be regarded as a factor. There is pressure for deliveries in the heavier lines.

Specifications for some products have kept up better than was expected after the rush in June, but in new contracts, as distinct from specifications, there has been such a slackening as was to be looked for after the heavy buying of May and June. The export trade is well maintained.

The mills are counting on an important addition to new tonnage from pending car business, concerning which there is evidently more urgency than the railroads have shown heretofore. The Grand Trunk is in the market for 2000 additional cars, the Boston & Albany for 5000, the Denver & Rio Grande for 1200, the St. Paul and the Southern for 700 each, and the Virginian Railway for 750, while the New York Central, Big Four, Lake Shore and Michigan Central are reported to be figuring on 15,000.

New rail orders have been relatively light. The Northern Pacific has bought 8000 tons at Chicago and the Paris & Mt. Pleasant Railroad 4000 tons. A Southern line has placed 5000 tons at Ensley and the Pennsylvania has ordered 4000 tons of Bessemer rails from an Eastern mill. Some of the railroads are seeking fall deliveries, which the mills can no longer entertain.

In the Western wire and wire nail trade the absence of any considerable accumulation of stocks is noticeable. There is still some shading in the prices of the leading seller, but there are indications that a further advance of $1 a ton may soon be announced.

The Steel Corporation's heavy blast furnace campaign has told on operating capacity, two Pittsburgh furnaces and one at Cleveland having gone out for repairs. It has made one purchase of Bessemer pig iron in the past week—5000 tons at $14.25 at valley furnace. It has also again been a buyer of billets and sheet bars from independent companies to tide over small shortages.

The pig iron market shows more firmness in several directions, but the new higher prices reported are thus far asking prices and not the basis of actual sales. Some Chicago makers, for example, are asking $15 at furnace for No. 2, and in the Lehigh Valley the higher quotation of $15.25 for No. 2X has appeared. Chicago and St. Louis report some round lot inquiries for foundry iron, and St. Louis sales amounted to 10,000 tons, but in the rest of the country inquiry and actual sales are light. Stocks of Alabama iron were reduced by 7000 tons in June or to 111,000 tons at the end of the month. While $11.50 Birmingham is the usual minimum for No. 2 iron, and a few sales for delivery late in the year have been made at $12, there have been sales of Tennessee iron for the third quarter on the basis of $11.25.

The basic iron available at $13.25 at valley furnace has been largely taken up by the recent buying of one company and the market has advanced to $13.50.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	July 17, 1912.	July 10, 1912.	June 19, 1912.	July 19, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$15.75	$15.75	$15.25	$15.00
Foundry No. 2, Valley furnace	13.25	13.25	13.25	13.50
Foundry No. 2, Southern, Cincinnati	14.75	14.75	14.25	13.25
Foundry No. 2, Birmingham, Ala.	11.50	11.50	11.00	10.00
Foundry No. 2, at furnace, Chicago*	14.50	14.50	14.50	15.00
Basic, delivered, eastern Pa.	15.50	15.50	15.25	14.25
Basic, Valley furnace	**13.50**	13.25	13.25	13.00
Bessemer, Pittsburgh	15.15	15.15	15.15	15.90
Malleable Bessemer, Chicago	14.50	14.50	14.50	15.00
Gray forge, Pittsburgh	13.90	13.90	13.90	13.90
Lake Superior charcoal, Chicago	16.25	16.25	16.25	16.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	21.50	21.50	20.50	21.00
Open hearth billets, Pittsburgh	21.50	21.50	20.50	21.00
Forging billets, Pittsburgh	28.00	28.00	28.00	26.00
Open hearth billets, Philadelphia	24.40	24.40	23.40	23.40
Wire rods, Pittsburgh	25.00	25.00	25.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	16.00	14.00
Iron rails, Philadelphia	16.50	16.50	16.50	17.50
Car wheels, Chicago	14.00	14.00	14.00	12.50
Car wheels, Philadelphia	14.00	14.00	13.50	13.00
Heavy steel scrap, Pittsburgh	13.50	13.50	13.50	13.00
Heavy steel scrap, Chicago	11.50	11.50	11.75	10.50
Heavy steel scrap, Philadelphia	13.50	13.50	13.50	13.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel. Per Pound to Largest Buyers:	July 17, 1912. Cents.	July 10, 1912. Cents.	June 19, 1912. Cents.	July 19, 1911. Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.32½	1.32½	1.30	1.27½
Iron bars, Pittsburgh	1.35	1.35	1.25	1.25
Iron bars, Chicago	1.35	1.30	1.27½	1.20
Steel bars, Pittsburgh	1.25	1.25	1.20	1.25
Steel bars, tidewater, New York	1.41	1.41	1.36	1.41
Tank plates, Pittsburgh	1.30	1.30	1.25	1.35
Tank plates, tidewater, New York	1.46	1.46	1.41	1.51
Beams, Pittsburgh	1.30	1.30	1.25	1.35
Beams, tidewater, New York	1.46	1.46	1.41	1.51
Angles, Pittsburgh	1.30	1.30	1.25	1.35
Angles, tidewater, New York	1.46	1.46	1.41	1.51
Skelp, grooved steel, Pittsburgh	1.20	1.20	1.20	1.25
Skelp, sheared steel, Pittsburgh	1.25	1.25	1.25	1.35

Sheets, Nails and Wire, Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	1.90	1.90	2.00
Wire nails, Pittsburgh	1.60	1.60	1.60	1.70
Cut nails, Pittsburgh	1.55	1.55	1.55	1.60
Fence wire, ann'led, 0 to 9, Pgh.	1.40	1.40	1.40	1.50
Barb wire, galv., Pittsburgh	1.90	1.90	1.90	2.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt shipment	$2.25	$2.25	$2.00	$1.40
Furnace coke, future delivery	2.25	2.25	2.35	1.55
Foundry coke, prompt shipment	2.40	2.40	2.40	1.80
Foundry coke, future delivery	2.50	2.50	2.50	2.00

Metals, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	17.12½	17.50	17.62½	12.75
Electrolytic copper, New York	17.00	17.37½	17.50	12.55
Spelter, St. Louis	7.15	7.10	6.90	5.57½
Spelter, New York	7.30	7.25	7.05	5.75
Lead, St. Louis	4.60	4.67½	4.37½	4.40
Lead, New York	4.70	4.75	4.50	4.50
Tin, New York	43.62½	44.62½	48.50	42.00
Antimony, Hallett, New York	7.87½	7.75	7.75	8.00
Tin plate, 100-lb. box, New York	$3.64	$3.64	$3.64	$3.94

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific Coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.30c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per square ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $25. Fence wire, Nos. 0 to 9, per 100 lb., terms, 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.40; galvanized, $1.70. Galvanized barb wire, to jobbers, $1.90; painted, $1.60. Wire nails, to jobbers, $1.60.

The following table gives the price to retail merchants on wire in less than carloads, including the extras Nos. 10 to 16, which are added to the base price:

Fence Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.55	$1.60	$1.65	$1.70	$1.80	$1.90	$2.00	$2.10
Galvanized	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in., on one or both legs, ¼ in. and over, 1.30c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.35 to 1.40
H-beams over 18 in.	1.35 to 1.40
Angles over 6 in.	1.35 to 1.40
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909	1.35 to 1.40
Tees, 3 in. and up	1.35 to 1.40
Zees, 3 in. and up	1.30 to 1.35
Angles, channels and tees, under 3 in. plus full extras as per steel bar card Sept. 1, 1909.	1.35 to 1.40
Deck beams and bulb angles	1.60 to 1.65
Hand rail tees	2.10 to 2.25
Checkered, trough and corrugated floor plates	2.25 to 2.50

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 3 ft., inclusive	.25
Under 2 ft., to 1 ft., inclusive	.50
Under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.45 to 1.50
Nos. 9 and 10	1.50 to 1.55
Nos. 11 and 12	1.55 to 1.60
Nos. 13 and 14	1.60 to 1.65
Nos. 15 and 16	1.70 to 1.75

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12	1.65 to 1.70
Nos. 13 and 14	1.70 to 1.75
Nos. 15 and 16	1.75 to 1.80
Nos. 17 to 21	1.80 to 1.85
Nos. 22, 23 and 24	1.85 to 1.90
Nos. 25 and 26	1.90 to 1.95
No. 27	1.95 to 2.00
No. 28	2.00 to 2.05
No. 29	2.05 to 2.10
No. 30	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.10 to 2.15
Nos. 12, 13 and 14	2.20 to 2.25
Nos. 15 and 16	2.25 to 2.30
Nos. 17 to 21	2.50 to 2.55
Nos. 22, 23 and 24	2.60 to 2.65
Nos. 25 and 26	2.80 to2.85
No. 27	2.95 to 3.00
No. 28	3.10 to 3.15
No. 29	3.20 to 3.25
No. 30	3.40 to 3.45

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following:

Corrugated Roofing Sheets by Weight.

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., as announced by most of the leading sheet manufacturers, are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

	Gauges, cents per 100 lb.			
Painting.	29	25 to 28	19 to 24	12 to 18
Regular or oiling	...	0.15	0.10	0.05
Graphite, regular	...	0.25	0.15	0.10
Forming.				
2, 2½, 3 and 5 in. corrugated	0.05	0.05	0.05	0.05
2 V-crimped, without sticks	0.05	0.05	0.05	...
⅝ to 1¼ in. corrugated	0.10	0.10	0.10	...
3 V-crimped, without sticks	0.10	0.10	0.10	...
Pressed standard seam, with cleats	...	0.15	0.15	...
Plain roll roofing, with or without cleats	0.15	0.15	0.15	...
Plain brick siding	...	0.20	...	...
3-15 in. crimped	0.20	0.20	0.20	...
Weatherboard siding	...	0.25	0.25	...
Beaded ceiling	...	0.25	0.25	...
Rock, face brick and stone siding	...	0.25	0.25	...
Roll and cap roofing, with caps and cleats	0.25	0.25	...	...
Roofing valley, 12 in. and wider	...	0.25	0.25	...
Ridge roll and flashing (plain or corrugated)	...	0.65	0.65	0.65

Wrought Pipe.—The following are the jobbers' carload discounts (card weight) on the Pittsburgh basing

card on steel pipe, in effect from June 1, 1912, on 6-in. and smaller, and from July 1, 1912, on sizes above 6-in.; black iron pipe from June 15, 1912; galvanized iron pipe from June 15, 1912, one point greater being allowed on merchant weight:

Butt Weld.

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ in.	73	53	..	..
⅜ in.	74	64	68	52
½ in.	77	67	71	58
¾ to 1½ in.	80	72	74	63
2 to 3 in.	81	74	75	64

Lap Weld.

1½ in.	..	..	69	58
2 in.	78	71	71	62
2½ to 4 in.	80	73	73	65
4½ to 6 in.	79	71	72	64
7 to 12 in.	77	67	70	60
13 to 15 in.	54	..	46	..

Plugged and Reamed.

1 to 1½ in., butt weld	78	70	72	61
2 to 3 in., butt weld	79	72	73	62
2 in., lap weld	76	69	69	60
2½ to 4 in., lap weld	78	71	71	63

Butt Weld, extra strong, plain ends, card weight.

⅛, ¼, ⅜ in.	69	59	64	54
½ in.	74	68	69	62
¾ to 1½ in.	78	72	73	64
2 to 3 in.	79	73	74	65

Lap Weld, extra strong, plain ends, card weight.

1½ in.	..	..	63	55
2 in.	75	69	70	62
2½ to 4 in.	77	71	72	65
4½ to 6 in.	76	70	71	64
7 to 8 in.	69	59	64	54
9 to 12 in.	64	54	59	49

Butt Weld, double extra strong, plain ends, card weight.

½ in.	64	58	59	51
¾ to 1½ in.	67	61	62	54
2 to 2½ in.	69	63	64	56

Lap Weld, double extra strong, plain ends, card weight.

2 in.	65	59	60	51
2½ to 4 in.	67	61	62	55
4½ to 6 in.	66	60	61	55
7 to 8 in.	59	49	54	44

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1¼ to 2¼ in.	64	1½ in.	48
2½ in.	66½	1¾ to 2¼ in.	50
2¾ to 3¼ in.	71½	2½ in.	55
3½ to 4 in.	74	2¾ to 3¼ in.	57½
5 to 6 in.	66½	3½ to 5 in.	60
7 to 13 in.	64		

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Pittsburgh

PITTSBURGH, PA., July 17, 1912.

Important events of the week are an advance in prices by the American Sheet & Tin Plate Company of $2 a ton in box annealed black sheets, $3 a ton in galvanized and $1 a ton in black tin mill products, effective from July 16, and an advance of 10 cents a keg in railroad spikes by the leading makers. Bolt and rivet makers are advancing prices of these products also this week. Aside from the above the feature of the situation is the continued heavy volume of specifications for all kinds of finished material, especially shapes, plates, bars, sheets, tin plate and pipe. Some leading makers state there has been very little falling off in specifications this month as compared with June. It is stated that a fair amount of new tonnage has been sold on the present basis for plates, shapes and steel bars, larger than had been generally expected. Some consumers who thought they had covered their requirements through third quarter have had more business than they looked for in finished products, and as a result have come into the market again. It is not believed that the volume of specifications in July and August will be as heavy as in May and June, but the mills state that this does not indicate any falling off in the steel business, but simply the summer quietness which always comes. The local pig iron market continues quiet, with basic showing a stronger tone, and being generally held at $13.50 for delivery over the remainder of the year. The most important sale of the week in Bessemer iron was at $14.25, at furnace, for prompt delivery, not $14.40 as reported in some quarters. The semi-finished steel market is active in specifications, but new demand is quiet, as most consumers are covered and are getting very satisfactory deliveries from the mills. The coke trade this week is stronger, and the coke operators and dealers who have been holding out for $2.50 per ton, at oven, seem more confident. Embargoes on scrap at two or three important points of delivery are restricting shipments to some extent and scrap has been quiet in the past week but fairly strong.

Pig Iron.—Reports that Carnegie Steel Company was running very short of pig iron and had bought three or four different lots of 3,000 to 5,000 tons each are incorrect. The only purchase of pig iron by this company in the past week was one of 5,000 tons from a Shenango Valley furnace interest for prompt shipment at $14.25 at furnace. The iron will be used at the Youngstown, Ohio, and New Castle, Pa., works. A local interest is credited with having been an active buyer of basic iron in the past week and has pretty well cleaned up all the available supply for third quarter, with the result that the market is stronger and basic iron is now pretty firmly held at $13.50, at Valley furnace, for remainder of the year delivery. The market on foundry iron is quiet, with prices ruling firm at $13.25 for prompt and $13.50 for remainder of the year delivery for Northern No. 2 iron. Sales are reported of about 1500 to 2000 tons of gray forge iron at $13, at Valley furnace. The local pig iron market is slightly stronger this week, but the only change we make in price is on basic iron, which is 25c. a ton higher. We quote as follows: Bessemer iron, $14.25; basic, $13.50; Northern No. 2 foundry prompt delivery, $13.25, and for last half, $13.50; malleable Bessemer, $13.25, and gray forge, $13, all at Valley furnace, the freight rate to Pittsburgh district being 90c. a ton.

Steel Billets and Sheet Bars.—For some time the Jones & Laughlin Steel Company has been installing the necessary equipment to use the duplex process at its steel plant at Aliquippa, Pa. A Bessemer converter has about been finished and the company expects to be making steel by the duplex process early in August. This will increase its output of steel from 1000 tons a day to nearly 2000 tons. The company will blow in its fourth Aliquippa blast furnace early in August to take care of the increased need of metal when the duplex process is started. The market is firm, but there are few complaints from consumers regarding deliveries, and with the steel mills running to maximum capacity they are about able to take care of current consumption. Specifications against contracts for billets, sheet and tin bars are heavy, and shipments of steel this month by the mills will be nearly as large as in June, which was a record breaker. We quote for delivery in third quarter as follows: Bessemer and open-hearth billets, $21.50 to $22; Bessemer and open-hearth sheet bars, $22 to $22.50; axle billets, $25 to $26; forging billets to be used for general forging purposes, $28, all f.o.b. cars Pittsburgh or Youngstown mill.

Ferroalloys.—The local market on ferromanganese and ferrosilicon is quiet, most consumers being covered for the remainder of the year, though one large steel company has been inquiring for next year. Reference has been made to German ferromanganese, of which several hundred tons has been sold in this country. Though it runs slightly higher in phosphorus than the English product, it is stated that it has been found to be satisfactory. We quote 80 per cent. ferromanganese at $48.50 Baltimore, for delivery over last half of this year and into the first half of 1913, while small lots for prompt shipment can be had at the same price and in some cases at a slightly lower figure. We quote 50 per cent. ferrosilicon in lots up to 100 tons at $72.50; over 100 tons to 600 tons, $71.50, and over 600 tons, $70.50, Pittsburgh. The lower grades are ruling at about $20 for 10 per cent.; $21 for 11 per cent.; $22 for 12 per cent., f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio. On ferrotitanium we quote 8c. per lb. for carload lots; 10c. per lb. in 2000-lb. lots and over, and 12½c. per lb. in lots up to 2000 lb.

Wire Rods.—A fairly active inquiry is reported for wire rods for delivery over last half of the year, and some business has recently been closed. One local rod mill reports that it is practically sold up and is not offering rods in the open market for balance of the year delivery. We quote Bessemer, open hearth and chain rods at $25, Pittsburgh.

Muck Bar.—A sale of 1000 tons of muck bar is reported at slightly above $30, Pittsburgh. Muck bar is very scarce, most makers holding all they make for their own needs, and very little is being offered

in the open market. We quote best grades of muck bar, made from all pig iron, at $30 to $30.50, Pittsburgh.

Skelp.—The mills rolling skelp are pretty well filled up through third quarter, but are making fairly prompt deliveries to customers. The present great activity in the pipe trade is causing a very heavy consumption of skelp, and for prompt delivery it is hard to obtain. We quote grooved steel skelp at 1.20c.; sheared steel skelp, 1.25c.; grooved iron skelp, 1.65c. to 1.70c., and sheared iron skelp, 1.70c. to 1.75c., delivered buyer's mill in the Pittsburgh district.

Steel Rails.—The Carnegie Steel Company reports that specifications against contracts for standard sections are coming in quite freely and inquiries are active, especially on rails for export. The company has recently taken some very good export business, and it is stated prices realized are practically as high as for domestic rails. New demand and specifications for light rails are active and the Carnegie Steel Company booked over 4000 tons in the past week. We quote spliced bars at 1.50c. per lb. and rails as follows: Standard sections, 1.25c. per lb.; 8 and 10-lb., light rails, 1.29½c.; 12 and 14-lb., 1.20c.; 16 and 20-lb., 1.15c.; 25, 30, 35, 40 and 45-lb., 1.10c.; in carload lots, f.o.b. Pittsburgh.

Structural Material.—New inquiry for fabricated material is active, and several of the local structural shops are so well filled up that they are bidding on little new work, being unable to make the deliveries wanted. The McClintic-Marshall Construction Company has taken about 1200 tons for new steel mill buildings for the Republic Iron & Steel Company at Youngstown, Ohio. The American Bridge Company has taken 7000 to 8000 tons for steel buildings in the East, and has also closed for about 5000 tons of Western bridge work. Prices on fabricated work are said to be improving, but they are still below the basis of 1.30c. for plain material. We quote beams and channels up to 15 in. at 1.30c., Pittsburgh, on new orders.

Plates.—No important car orders have been placed in the past week, but reports are persistent that some of the leading railroads will soon have active inquiries out for a considerable number of steel cars. The Standard Steel Car Company at Butler, Pa., which can turn out about 60 steel cars per day, is filled for practically the remainder of the year, while the Pressed Steel Car Company, which has a capacity for about 110 steel cars at its McKees Rocks and Woods Run plants, is running to nearly full capacity. The market on plates is firm and on universal plates some mills cannot promise deliveries inside of 12 weeks. We quote ¼ in. and heavier plates at 1.30c., Pittsburgh.

Steel Bars.—Mills report that specifications against contracts for steel bars placed so far show only a slight falling off as compared with June, while the amount of new business secured at the 1.25c. price for steel bars has been larger than expected. It is stated that a great many consumers of steel bars who placed contracts some time ago at the 1.10c. and 1.15c. price have found they did not buy heavily enough and have recently come in the market and placed orders at 1.25c. at mill. All the steel bar mills are from four to eight weeks back in shipments and with actual tonnage on the books it is expected they will operate through all of the third quarter and probably through the remainder of the year at full capacity. The hot weather of the past week or 10 days has cut down output to some extent, and as yet the mills are not able to catch up on deliveries. The new demand and specifications against contracts for iron bars are fairly heavy, and the iron bar mills are running to fuller capacity and with more orders on their books than for several years. It is claimed that premiums of $1 to $2 a ton are being paid for small lots of steel bars for spot shipment. We quote steel bars at 1.25c. and iron bars at 1.35c., f.o.b. Pittsburgh.

Hoops and Bands—The new demand for both hoops and bands is only fair, as nearly all consumers covered their wants for some time ahead prior to the advance in bands several weeks ago, and also before the advance in hoops was made on July 10. Mills report that specifications against contracts are still coming in very freely. All the leading makers of hoops and bands are now quoting on the basis of 1.25c. for bands, extras as per the steel bar card, and 1.40c. for hoops, f.o.b. Pittsburgh.

Sheets.—Following the advance of $1 a ton on blue annealed sheets effective from July 3, which made Nos. 3 to 8 gauge 1.40c., the American Sheet & Tin Plate Company has just announced an advance effective from July 16 of $2 a ton on American Bessemer sheets, $3 a ton on galvanized and $2 a ton on black tin mill products. This makes the net prices of American Sheet & Tin Plate Company on No. 28 box annealed sheets 2.05c., on No. 28 galvanized 3.15c. and on No. 28 gauge black plate 2c. It is probable the other makers of sheets will make similar advances in prices. The new demand for black and galvanized and roofing sheets and also for black plate is heavy. It is not unlikely that only a small tonnage of sheets will be sold at the higher prices for some little time, as most consumers have covered ahead at the prices in effect prior to the advance.

Tin Plate.—Tin plate operations will break all records this season. The mills are unable to catch up with the demands of their customers and are running considerably behind in deliveries. The supply of tin bars is reported to be better than for some time, and there is very little delay in operations of tin plate mills on this account, but there is still considerable shortage of labor, and this is interfering with output to some extent. Prices on tin plate are strong, and several mills state they are adhering to $3.50 per base box. We quote tin plate at $3.50 base for 14 x 20 coke plates, f.o.b. Pittsburgh.

Bolts and Rivets.—A meeting of manufacturers of rivets and bolts was held this week and advances in prices of rivets and bolts are reported. Demand is referred to as heavy, most of the makers being sold up for three or four months ahead and are considerably back in deliveries. They feel that for current business they should be getting higher prices. In the absence of local advices as to new prices we repeat our previous quotations for this week: Button head structural rivets, $1.60, and cone head boiler rivets, $1.70 per 100 lb. base in carload lots, f.o.b. Pittsburgh; G. P. coach and lag screws 80 and 20 per cent. off; small carriage bolts, cut threads, 80 and 7½ per cent. off; small carriage bolts, rolled threads, 80 and 15 off; large carriage bolts, 75 and 10 off; small machine bolts, rolled threads, 80 and 20 off; small machine bolts, cut threads, 80 and 12½ off; large machine bolts, 75 and 15 off; square hot-pressed nuts, blank and tapped, $6.30 off, and hexagon nuts, $7.10 off. These prices are in lots of 300 lb. or over delivered within a 20c. freight radius of maker's works.

Shafting.—The shafting trade is in better condition than for some time and it is stated that discounts are being better observed. Some recent current large business was placed at the full discounts. We quote cold rolled shafting at 65 per cent. off in carload and larger lots and 60 per cent. off in less than carload lots, delivered in base territory.

Spelter.—Prices of spelter continue to climb, and prime grades of Western spelter are sold to-day at 7.05c. to 7.10c., East St. Louis, equal to 7.17½c. and 7.22½c., Pittsburgh. Consumption is heavy and still higher prices in the near future are freely predicted.

Railroad Spikes.—The leading makers of spikes announce an advance of 10c. per 100 lbs., effective from Tuesday, July 16. Most of the railroads have covered their requirements for some time ahead. The Louisville & Nashville order for 12,000 kegs of spikes has been placed, 4000 kegs being taken by the Jones & Laughlin Steel Company and 8000 kegs by Dilworth, Porter & Co., Ltd. We now quote railroad spikes, base sizes, 5½ x 9/16 in., at $1.60, and small railroad and boat spikes $1.65 to $1.70, per 100 lb., f.o.b. Pittsburgh.

Wire Products.—Some of the wire mills have taken a fair amount of new businesss for delivery over the next 60 days at the full price of $1.60 base for wire nails. Specifications against contracts are reported as coming in quite freely and the wire and wire nail trade is showing signs of betterment. Regular prices are being maintained except for some points of delivery in the Southwest. We quote wire nails at $1.60; cut nails, $1.55; galvanized barb wire, $1.90; painted, $1.60; annealed fence wire, $1.40, and galvanized fence wire, $1.70, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Steel.—The new demand so far this month and specifications against contracts have not been quite as heavy as in June, but a slowing down was expected in view of the enormous volume of business specified for last month. The mills are well sold up for the next two to three months and are back in deliveries. Prices are firm and on iron finished tire about $1 higher. We quote: Iron finished tire, 1½ by ⅜ in. and larger, 1.25c., base; under ⅜ in., 1.35c., base; planished tire, 1.45c.; channel tire, ¾, ⅞ and 1 in., 1.70c.; 1⅛ in. and larger, 1.60c.; toe calk, 1.75c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.60c.; cutters shoes, tapered or bent, 2.20c.; spring steel, 1.80c.; machinery steel, smooth finish, 1.60c., all f.o.b. cars, Pittsburgh.

Merchant Pipe.—Reports were current last week

of an advance in prices of merchant pipe of one point, or $2 a ton, but were untrue, though it is the expectation of the trade that there will be another advance of about one point between now and August 1. The new demand for merchant pipe continues heavy, and the pipe mills are filled up with orders over the next two or three months and are considerably behind in deliveries. The market is strong and several of the leading pipe mills are now refusing to allow quotations to remain open more than 24 hours. Last week several leading mills withdrew quotations that were out and are quoting higher figures. The Union Well Supply Company, of Los Angeles, Cal., has placed 70 miles of 8-in. steel pipe, divided between two mills. The Panama Pacific International Exposition is in the market for about 2500 tons of wrought steel pipe. It is stated that regular discounts are being very firmly held, and are as follows: 80 per cent. on black and 72 for galvanized for ¾ to 1½ in. steel pipe, and 74 per cent. for black and 63 per cent. for galvanized iron pipe ¾ to 1½ in. These are jobbers' carload discounts, card weight.

Boiler Tubes.—The new demand for boiler tubes and also specifications against contracts are heavy, and the tube mills are running to full capacity and are filled up over the next two or three months. Merchant tubes are also quite active and the whole tube trade is referred to as being in more satisfactory condition than for some time. It is stated that regular discounts on merchant and locomotive tubes are being firmly held.

Iron and Steel Scrap.—The expected falling off in demand for scrap due to the shut down of some of the mills on July 1 for repairs has not been as large as anticipated, and the scrap trade is reported as fairly active with prices strong. At present embargoes on scrap, routed to the Pittsburgh Steel Company at Monessen, Pa., and the yards of Max Solomon at Carnegie, Pa., are on, and the Central Iron & Steel Company has also placed an embargo on scrap, but this does not affect the local market to any extent. The scrap list of the Baltimore & Ohio Railroad closes on Friday, July 19, and local dealers who bid fairly high prices report they got very little scrap. Consumption is still very heavy and dealers are afraid to sell short for fear they will not be able to cover. We note sales of 3000 to 4000 tons of heavy steel scrap for Sharon, Youngstown and Steubenville delivery at $13.50; also a sale of 600 tons of low phosphorus melting scrap at $15.75; 1000 tons of wrought iron turnings at $10.75, delivered. Some dealers believe that prices on scrap will show a material advance in the near future, and the market at present is referred to as being fairly strong. Dealers quote as follows, per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$13.50
No. 1 foundry cast	$13.00 to 13.25
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	11.75 to 12.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to 14.75
No. 1 railroad malleable stock	12.50 to 12.75
Grate bars	9.75 to 10.00
Low phosphorus melting stock	15.75
Iron car axles	22.50 to 22.75
Steel car axles	15.75 to 16.00
Locomotive axles	22.00 to 22.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.25
*Cast iron borings	9.50 to 9.75
*Machine shop turnings	10.00 to 10.25
†Sheet bar crop ends	14.75 to 15.00
Old iron rails	15.75 to 16.00
No. 1 wrought scrap	13.75 to 14.00
Heavy steel axle turnings	11.00 to 11.25
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—The local situation in coke is stronger this week and the operators and dealers who have been insisting that present conditions in the steel business fully warrant $2.50 a ton at oven for best grades of furnace coke believe they will gain their point. Standard grades of furnace coke can be had at $2.25 or less at oven for prompt shipment, but it is claimed that the amount available at this price is relatively small, and that on any large tonnage for prompt shipment or for remainder of the year delivery $2.50 a ton would have to be paid. An Eastern steel company made an offer of $2.15 on a large tonnage of furnace coke for July and August shipment, but it was not accepted and the business has not been closed. No important sales of coke have been made in the past week, and the market is simply marking time. We quote standard grades of furnace coke for prompt shipment at $2.25 to $2.50 per net ton at oven, and these prices also accurately represent the market on furnace coke for delivery over remainder of the year. One or two coke makers will sell for balance of the year at $2.25 at oven, but the majority are holding out for $2.50. Standard makes of 72-hr. foundry coke are ruling at about $2.50 to $2.75 per net ton at oven for delivery over remainder of the year. It is probable that one or two standard makes of foundry coke may be obtained at $2.40 at oven.

The Carnegie Steel Company, Pittsburgh, announces an advance of $4 a ton on sheet steel piling, the new prices being 1.55c. base on United States steel sheet piling and 1.65c. on Friestedt and symmetrical piling.

Chicago

CHICAGO, ILL., July 15, 1912.

Except for their inability to fill the requirements of the trade more rapidly, the situation in which the mills of this territory find themselves continues to be eminently satisfactory. Shipments now being made still contain a large proportion of low priced business, but the average is moving upward rapidly. Further satisfaction is obtained in the promise of extended purchasing of rails and rolling stock by the railroads during the fall months of the year. New business is being offered at a much greater rate than was anticipated and even at the advanced schedule of prices premiums are being paid for favorable deliveries. Shipments out of store are exceptionally heavy and the local jobbers are fully a week behind. Some large structural work is now being figured on the basis of material out of jobbers' stocks. Several small orders for rails were placed during the week and a large order for track fastenings. Structural contracts placed during the week were not large, but figures are being taken for 13,000 tons of steel for smelters in Arizona. An increased activity is noted in the pig iron market and a number of important sales have been made. Inquiry also is heavier both for Northern and Southern iron. Prices are firmer and an advance in the price of local iron is announced. Several melters of scrap in this market have resumed buying and a freer movement prevails. Purchases are generally on a slightly lower basis, but a continuance of demand will undoubtedly be followed by the recovery of previous values which are now more justified by the market conditions in finished products than formerly.

Pig Iron.—Following announcements from the several furnaces making Birmingham irons that their price for fourth quarter was $12 for No. 2 and the sale of $11.50 iron was limited, inquiry became more active and various large sales were made, in some instances amounting to 2000 and 3000-ton lots. The demand for Northern iron presented a similar situation and an Illinois manufacturer of agricultural implements is asking for prices on 3500 tons of malleable in addition to 2500 tons of Southern iron. A large manufacturer of electrical machinery is in the market for 2000 to 3000 tons for its Ohio and Illinois plants. Other sales of 1800, 1200, 1000 and 300 tons are reported. In this buying the speculative purpose seems to have been entirely eliminated and purchases represent actual requirements only. Local furnaces announce an advance to the basis of $15 f.o.b. furnace, although no sales at this figure have been reported as yet. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being nearly 50c. per ton. Other quotations are for Chicago delivery on prompt shipments as follows:

Lake Superior charcoal	$16.25 to $16.75
Northern coke foundry, No. 1	15.00 to 15.50
Northern coke foundry, No. 2	14.50 to 15.00
Northern coke foundry, No. 3	14.25 to 14.50
Northern Scotch, No. 1	16.00 to 16.50
Southern coke, No. 1 foundry and No. 1 soft	16.35 to 16.85
Southern coke, No. 2 foundry and No. 2 soft	15.85 to 16.35
Southern coke, No. 3	15.35 to 15.85
Southern coke, No. 4	14.85 to 15.35
Southern gray forge	14.35 to 14.85
Southern mottled	13.85
Malleable Messemer	14.50 to 15.00
Standard Bessemer	16.75
Basic	14.50 to 15.00
Jackson County and Kentucky silvery, 6 per cent.	17.40
Jackson County and Kentucky silvery, 8 per cent.	18.40
Jackson County and Kentucky silvery, 10 per cent.	19.40

Rails and Track Supplies.—An order for 3800 tons of rails was placed with the local mills, although it is understood that a considerably larger tonnage was declined on account of the delivery desired. A heavy amount of track fastenings was placed during the week and a Western railroad is attempting to place 5000 to 6000 tons of axles for reasonably prompt shipment. General credence is given to the report that

railroad plans provide for the buying of a quantity of both rails and cars before the close of the year. We quote standard railroad spikes at 1.60c. to 1.70c., base; track bolts with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.20c. to 1.25c.; 16 to 20 lb., 1.25c. to 1.30c.; 12 lb., 1.30c. to 1.35c.; 8 lb., 1.35c. to 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Fabricators are having difficulty in arranging for shipment of material from mill in figuring architectural steel, and in one instance near Pekin, Ill., involving about 1000 tons of structural material, figures are being based on material from store. In addition to the contract for the University of Illinois armory involving 1192 tons and formally awarded to the Morava Construction Company last week, contracts for fabricated steel were small individually and aggregated only 2600 tons. They include 122 tons for highway spans for Adams County, Wash., awarded to the Central States Bridge Company; 110 tons for a hospital at Salt Lake City to the Minneapolis Steel & Machinery Company; 121 tons for the Billings, Mont., post office to the Wurster Construction Company, Kansas City; 100 tons for the Duluth, South Shore & Atlantic to the Wisconsin Bridge Company; 524 tons for San Benito County, Cal., bridges to the American Bridge Company; 560 tons for the Presbyterian Hospital, Chicago, to the Gage Structural Steel Company; 209 tons for pier No. 26 San Francisco to the Union Iron Works and 237 tons for bridges and turntables for the Denver & Rio Grande to the American Bridge Company. Figures are being taken for 8000 tons of steel for a smelter at Jerome, Ariz., and 5000 tons for a similar project at Globe, Ariz. We quote for mill shipment, Chicago delivery, 1.48c. and from store, 1.80c.

Plates.—For plate shipments in two and three weeks premiums are being commonly paid, and most of this business is being placed with Eastern mills, which are shipping from their own stocks at about $2 a ton above the Pittsburgh market. The local market is practically unable to absorb any of this business. Inquiry for locomotives is estimated to include nearly 300 engines, and recent purchases include 25 for the Canadian Pacific, 10 Mallet type for the Chicago, Milwaukee & St. Paul and 16 mallet type for the Denver & Rio Grande, all placed with the American Locomotive Company, in addition 14 Mikado locomotives for the latter road awarded to the Baldwin Locomotive Works. We quote for Chicago delivery, mill shipment, 1.48c., and from store, 1.80c.

Bars.—About the only bar mills seeking business in this market are the Eastern mills, to which Bessemer bar orders would be acceptable. For a moderate amount of this material prompt shipment can be promised. Bar iron shows increasing strength and apparently quotations as low as 1.30c. have disappeared. Hard steel bars also are bringing better prices, and on these bars delivery within three or four weeks can still be promised. We quote as follows: Bar iron, 1.35c.; hard steel bars, 1.30c. to 1.35c.; soft steel bars, 1.43c., and from store, soft steel bars, 1.70c., Chicago.

Sheets.—Conditions continue approximately the same as last reported as regards the sheet trade in this market. Miscellaneous business is almost entirely from the stocks of the large jobbers. We quote, Chicago delivery, as follows: Carload lots, from mill, No. 28 black sheets, 2.18c. to 2.23c.; No. 28 galvanized, 3.23c. to 3.33c.; No. 10 blue annealed, 1.63c. Prices from store are: No. 10, 1.95c.; No. 12, 2c.; No. 28 black, 2.50c., and No. 28 galvanized, 3.60c.

Rivets and Bolts.—The general advance throughout the raw material market is tending to stiffen quotations on rivets and bolts, and new discounts are being rumored. The tonnage shows an increase calculated to encourage higher values. We quote as follows: Carriage bolts up to ⅜ in. x 6 in., rolled thread, 80 and 15; cut thread, 80 and 7½; larger sizes, 75 and 7½; machine bolts up to ⅜ in. x 4 in., rolled thread, 80 and 20; cut thread, 80 and 12½, larger sizes, 75 and 12½; coach screws, 80 and 20; hot pressed nuts, square head, $6.30 off per cwt.; hexagon, $7.10 off per cwt. Structural rivets, ½ in. and larger, 1.78c. base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Cast Iron Pipe.—Lettings of large size are noticeably scarce, although awards of small lots and miscellaneous inquiry are very good. Based on the recent advances in pig iron, pipe prices are firmer and on some sizes higher quotations are being made. Figures on 1300 tons of high pressure pipe are being taken at Winnipeg, Can. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $27.50; 6 to 12 in., $26; 16 in. and up, $25, with $1 extra for gas pipe.

Wire Products.—Though a quiet period in the wire trade, strength is evidenced by the active preparations for a fall demand for fabricated wire products. Plans are being made for a very heavy movement. We quote as follows: Plain wire, No. 9 and coarser, base, $1.58; wire nails, $1.78; painted barb wire, $1.78 to $1.83; galvanized, $2.08; polished staples, $1.83; galvanized, $2.13, all Chicago.

Old Materials.—As a result of the resumption of buying of both steel scrap and rolling mill grades by some of the principal moters a much freer movement is apparent. Buying, however, is at somewhat lower prices than prevailed several weeks ago, when buying was discontinued. As the mills accumulated in most instances as large stocks as they could conveniently carry, buying for the present will do little more than keep pace with consumption, the mills simply maintaining their accumulated supply. The local market is probably somewhat softer by reason of the diminished consumption in the St. Louis market, as the scrap formerly used by the Republic Iron & Steel Company at its Tudor plant, amounting to at least 6000 tons monthly, will doubtless be diverted to this market. The only list offered by the railroads is one for 2000 tons by the Michigan Central. About half of this is old car wheels. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	$16.00 to $16.50
Old steel rails, rerolling	13.25 to 13.75
Old steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	14.00 to 14.50
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Shoveling steel	11.50 to 12.00
Steel axle turnings	9.50 to 10.00

Per Net Ton.	
Iron angles and splice bars	$13.75 to $14.25
Iron arch bars and transoms	15.25 to 15.75
Steel angle bars	11.25 to 11.75
Iron car axles	19.25 to 19.75
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	10.75 to 11.25
Cut forge	10.75 to 11.25
Steel knuckles and couplers	11.25 to 11.50
Steel springs	11.75 to 12.25
Locomotive tires, smooth	12.25 to 12.75
Machine shop turnings	7.00 to 7.25
Cast and mixed borings	6.25 to 6.50
No. 1 busheling	10.00 to 10.25
No. 2 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	10.00 to 10.25
Railroad malleable	11.75 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	9.00 to 9.25

Hickman, Williams & Co., Chicago, have been appointed exclusive sales agents in that territory for the Coal Products Company, Joliet, in the sale of metallurgical coke. This company is erecting by-product ovens and expects to be producing coke by September 1.

Philadelphia

PHILADELPHIA, PA., July 16, 1912.

Owing to filled up conditions of some of the finished material mills and their inability to enter orders for early delivery, the market has a somewhat irregular appearance. In instances new business since July 1 has shown a decline; on the other hand, mills in a position to accept orders for reasonably early delivery, particularly heavy steel plates, have been taking a much larger volume of orders and have no difficulty in obtaining premiums for prompt shipments. In many cases order books are so well filed, with deliveries being urged, that a slight recession in the volume of new orders is not unwelcome, particularly when the maximum output is restricted by labor shortage, as well as the heated term. Increased inquiry for plates and billets for export is noted. Shapes continue active and an advance in the prices of sheets has just been learned of. A moderate movement is noted in pig iron, usually in small tonnages. Buying in foundry grades has been more general and prices are firm, with an advancing tendency. Old material is quiet. Eastern shipyards have considerable business under negotiation. All the Delaware River yards are now pretty well filled up for a year ahead. In one instance a larger volume of business could be taken. Negotiations are still under way

against inquiries for several vessels for the South American trade, while an inquiry is still pending for the building of an 8000-ton freighter for foreign interests.

Iron Ore.—The demand has been very quiet. A number of eastern consumers state that requirements for the remainder of the year are pretty well covered. Importations for the week include 10,600 tons from Cuba, 12,520 tons from Newfoundland, and 4474 tons from Spain.

Pig Iron.—While the demand has not been heavy in any of the general grades, sales have been more varied than for some time past. Transactions have, for the most part, been confined to small lots. The exception has been in malleable grades in which sales aggregating some 4000 tons have been made, largely for second half shipment, at prices ranging from $15.90 to $16.10, delivered in this district. Moderate sales of charcoal iron, special analysis iron for car-wheel making, as well as fair sales of the higher grades of foundry iron are reported. Cast-iron pipe makers in this district have been taking in odd lots of off-grade irons, but no large definite inquiry is noted. Low-grade irons are now pretty firm at $15 minimum, delivered Delaware River points. Sales of some 3500 tons of Virginia low-grade iron have been made to cast-iron pipe makers in that district at $12.75, furnace, and further supplies for second half are reported under negotiation. Moderate lot sales of the higher grades of Virginia foundry iron in this territory are reported. Prices show a general upward tendency and, while sales of No. 2 X were made at $13 Virginia furnace, for third quarter, an advance of 25 cents has been general and numerous sales at the new basis are reported. In instances $13.25, furnace, is named for the remainder of the second half, while for fourth quarter $13.50, furnace, is the ruling quotation. Standard brands of eastern Pennsylvania No. 2 X are now quoted at $15.75 to $16.00, delivered for third quarter, with sales at both price levels. In instances $16.25, delivered, is done, but at this price business has been very light. Forge iron for rolling mill purposes has not been very active; an inquiry for several thousand tons of foundry forge from the local locomotive builder is, however, noted. Very little movement in steel-making grades is reported. Makers of basic iron pretty generally hold at $15.75, delivered, for this grade, although the price has not been established by any sales. A moderate movement in low phosphorus iron is noted, sales of standard analysis iron being made at $20, delivered here. The undertone is decidedly strong with prices still showing an upward tendency. One Eastern maker has advanced recent asking prices 25c., making No. 2 X $16, delivered here. Deliveries are being freely taken by consumers. The following range of prices is named for standard brands, delivered in buyers' yards in this district:

Eastern Pennsylvania No. 2 X foundry	$15.75 to $16.00
Eastern Pennsylvania No. 2 plain	15.50
Virginia No. 2 X foundry	16.00 to 16.25
Virginia No. 2 plain	15.75 to 16.00
Gray forge	15.00
Basic	15.50 to 15.75
Standard low phosphorus	20.00 to 20.25

Ferroalloys.—Some irregularity in prices of 80 per cent. ferromanganese for forward delivery is noted. Small lot sales for first half shipment are reported at $48.50, Baltimore, although in one instance a seller reports having done business at $50. The inside figure is reported still available, although an advance is generally expected. Very little demand for ferrosilicon is reported, prices being firm and unchanged.

Billets.—A larger volume of business has been entered by Eastern mills so far this month than was taken during a like period in June. Orders recently have been for larger quantities, in a number of instances lots of 1000 tons being entered at full prices. Quite a heavy demand for rolling billets is coming from Western consumers and a fair volume of business for export continues to be offered, but mills being pretty well covered are not anxious to sell too far ahead. Quotations are very firm at $24.40 to $25.40 for soft, basic open-hearth rolling billets, and $29.40 minimum for ordinary forging billets, delivered in this vicinity.

Plates.—Eastern plate mills continue to report a heavy volume of new business, considerably in excess of the productive rate. In instances delivery inside of four to six weeks is not available; in other cases, where orders can be pushed through in a few weeks, premiums ranging from $1 to $4 a ton have been paid. Universal plates continue in good demand and are firm at 1.50c. minimum. Considerable export business is being offered. One lot of 50,000 tons of boat plates for export is being figured on in part by several mills. Inquiries for 3000 to 5000 tons of skelp for export for pipe work have been received, while smaller amounts of plates for export are also before the trade. A very fair business in domestic boat plates is under negotiation. Labor scarcity still has an effect on the productive rate of some of the Eastern mills. Ordinary heavy steel plates for near future delivery in this vicinity are firm at 1.45c. to 1.50c., while universal plates are held at 1.50c. minimum.

Structural Material.—As a rule the volume of new business coming to the mills has not been so heavy as it was last month, although mills are engaged at capacity with specifications already on hand. The bulk of the business in plain shapes has been confined to miscellaneous lots, for which mills quote, for early shipment, 1.50c., delivered. Several fair projects in fabricated work have been closed. The viaduct work for the Philadelphia & Reading Railway is credited to the Pennsylvania Steel Company. There has been a fair amount of small bridge work placed, but no new large projects have recently come out. Prices are firm, 1.45c. to 1.50c., delivered here, being named for ordinary plain shapes, with the tendency toward the top of the market as a minimum growing stronger.

Sheets.—A very good volume of business is coming to Eastern mills and it is not unlikely that prices will advance considerably before the week end. Makers in the East are fully engaged and new business comes out very freely. A moderate volume of business in Western sheets is reported at prices ranging from 2.10c. to 2.15c. for No. 28 gauge, delivered here.

Bars.—The demand has not been very active. Small orders predominate, on which producers readily obtain 1.32½c. to 1.37½c., delivered in this vicinity. On sharply competitive business it is likely that 1.30c. might be done on ordinary bars. Some little business has been entered at the new basis for steel bars, 1.40c., delivered here. Mills have heavy specifications against contracts and are comparatively well engaged.

Coke.—The situation appears easier. Consumers of furnace coke are showing less interest in second half contracts, confining purchases to prompt and near future deliveries, for which supplies are more freely available at $2.20, ovens, for standard grades. The same price is now considered available for contract coke, but no sales have been reported in this district. Moderate sales of foundry coke have been made at $2.40 to $2.50, ovens. The following range of prices per net ton is named for delivery in buyers' yards in this vicinity:

Connellsville furnace coke	$4.10 to $4.70
Connellsville foundry coke	4.55 to 4.70
Mountain furnace coke	3.70 to 4.30
Mountain foundry coke	4.15 to 4.30

Old Material.—The market has been extremely quiet. The majority of the sales have been in odd lots and in some grades not enough business has been done to establish a market. Small lots of heavy melting steel have been made at $13.50, but $14 would probably be paid for a round lot. Sellers are, however, disinclined to sell very far ahead. In some grades the demand has been at a standstill. Quotations are, to a large extent, normal, the following range about representing the market for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel scrap and crops	$13.50 to $14.00
Old steel rails, rerolling (nominal)	14.75 to 15.25
Low phosphorus heavy melting steel scrap	16.25 to 16.75
Old steel axles	17.50 to 18.00
Old iron axles	24.00 to 25.00
Old iron rails (nominal)	16.50 to 17.00
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal)	7.00 to 7.50
Wrought turnings	10.50 to 11.00
Cast borings	9.50 to 10.00
Machinery cast	13.75 to 14.25
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal)	12.00 to 12.50

Cleveland

CLEVELAND, OHIO, July 16, 1912.

Iron Ore.—The market shows more activity than for some time. Several inquiries came out during the week, one for 50,000 tons, one for 25,000 tons and others for smaller lots. Some consumers who bought rather conservatively early in the season find that they will need more ore than they contracted for and are now again coming into the market. There is also some in-

quiry from the East for small lots for mixtures. While the output of some mines has been sold up and other ore has been withdrawn from the market, there is plenty of ore available and little danger of scarcity late in the season. Prices are firm. Early in the season there were predictions that prices would be advanced during the latter part of the year. However, with plenty of ore still to be had there appears to be no disposition among dealers at present to attempt to get better prices. We quote prices as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; Old Range non-Bessemer, $3.05; Mesaba non-Bessemer, $2.85.

Pig Iron.—There is little activity in the market. Prices continue firm. One local interest has decided to adhere to $13.50 for No. 2 foundry for outside shipment and is trying to get $14, delivered Cleveland, which is an advance of 25 cents a ton for local delivery. We note the sale of 1800 tons of foundry and malleable to a Cleveland consumer at $13.50 at furnace, this tonnage being divided between Cleveland and Valley furnaces. Several sales of malleable iron have been made at $13.50, Cleveland, for shipments to points having a freight rate considerably in excess of 90 cents. The largest inquiry pending is from an Erie engine builder for 1000 tons of foundry iron. The foundry melt is heavy and some consumers who previously bought for their last half requirements state that they will need more iron for the last quarter. There is some inquiry for foundry iron for the first quarter of 1913, but furnaces are unwilling to quote for delivery beyond January 1. Southern iron is very firm with $11.25, Birmingham, as a minimum quotation for No. 2. Few producers are willing to quote less than $11.50 and some are asking $12 for the last quarter. For prompt shipment and last half we quote, delivered Cleveland, as follows:

Bessemer	$15.15
Basic	13.75
Northern No. 2 foundry	$13.75 to 14.00
Southern No. 2 foundry	15.60 to 16.10
Gray forge	13.25
Jackson silvery, 8 per cent. silicon	17.30 to 17.55

Coke.—There is a good demand for foundry grades. Considerable contracting has been done during the past few days at $2.75 per net ton at oven. Standard 72-hr. foundry coke is firm at that price for prompt shipment and contract. There is little change in the furnace coke situation. Standard furnace coke is offered at $2.40 for prompt shipment. While operators generally are holding to $2.50 for standard grades for the last half it is believed that contracts for a full year can be placed at $2.35.

Finished Iron and Steel.—Specifications on contracts are moderate, having fallen off considerably during the week. Only a limited amount of new business is coming out, consumers generally being under contract. Mills that are able to make prompt shipment are getting a good volume of small orders and many of these are being taken at premium prices. Generally the market is very firm. The plants of manufacturers that use a large amount of steel are very busy and are consuming about their maximum tonnage. Jobbers are getting a large volume of business and are adhering to recent advances in stock prices. Slow deliveries by mills are helping the warehouse business materially. Steel bars are quoted at 1.25c. and plates and structural material are quoted at 1.30c., Pittsburgh. In structural lines fabricating shops are well filled with work, but not a great deal of new business is coming out except for small work. It is expected that plans will be out this week for the steel for the Superior Avenue bridge, Cleveland. Plans will be out shortly for the buildings for the new steel plant of Corrigan, McKinney & Co., Cleveland. The demand for sheets continues active and the market is firm. Black sheets are generally quoted at 2c. to 2.05c. for No. 28 and galvanized at 3.10c. to 3.15c. for No. 28. Blue annealed sheets have been advanced to 1.45c. Pittsburgh, for No. 10. Rivets are very firm at 1.60c. for structural and 1.70c. for boiler. An advance in rivet prices is expected shortly. The new demand is light as consumers are mostly under contract. The demand for iron bars continues active and the market is very firm at 1.35c. at mill. For small lots 1.40c. is asked.

Old Material.—A fair volume of new inquiry for steel making scrap has come out during the week for shipment to outside mills. Canton and Sharon consumers are in the market for a considerable quantity. The local demand is light. Although mills are consuming a great deal of scrap they have more than they need for the present and are not taking material as fast as dealers want to ship it. While quotations are unchanged the market lacks the firmness it displayed during the past few weeks. The Michigan Central Railroad will close July 18 on a heavy list. Dealers' prices, f.o.b. Cleveland, are as follows:

Per Gross Ton.

Old steel rails, rerolling	$12.75 to $13.00
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	12.50 to 12.75
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	12.75 to 13.00
Light bundled sheet scrap	9.50 to 10.00

Per Net Ton.

Iron car axles	$18.50 to $19.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings	7.75 to 8.00
Steel axle turnings	8.50 to 8.75
No. 1 busheling	10.75 to 11.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 cast	11.25 to 11.75
Stove plate	9.00 to 9.50
Bundled tin scrap	11.00 to 11.50

J. D. Frisbie has discontinued his scrap business at 324 Garfield Building, Cleveland, and is now associated with E. A. Schwartzenberg & Co., scrap dealers, in the same building.

Cincinnati

CINCINNATI, OHIO, July 17, 1912.

(By Telegraph)

Pig Iron.—Although this market was rather slow in falling in line on the recent advance in Southern iron, the majority of producers now announce $11.50 Birmingham for No. 2 foundry for third quarter shipment, and several are asking $12 for fourth quarter business. However, $11.25 iron has not disappeared, and several third quarter sales were made last week at this figure. Inquiries are increasing in number, and business in sight just now is more encouraging than for several weeks past. Two central Indiana firms are asking respectively for 700 tons of Northern No. 3 foundry and 600 tons of mixed Northern and Southern No. 4. Several Michigan manufacturers are in the market, and two orders of 1000 tons each of Northern foundry iron are expected to be closed in that State before the end of the week. A southern Ohio firm will purchase soon 500 tons of analysis iron for last half shipment, and a Central Western company is feeling around for about 5000 tons of basic to be shipped this year. Among sales reported are several small lots of Southern No. 2 foundry for prompt shipment at $11.25, Birmingham basis. Offsetting this a number of purchases are reported at $11.50 for the third quarter. There is a slightly better demand for both Northern foundry and high silicon iron. Malleable is slow and the price remains at $13.50, Ironton, the same as on No. 2 foundry. Consumers do not appear anxious to contract for the first quarter of next year, although there have been a number of tentative inquiries put out, more especially for the lower grades that are now very scarce in both producing districts. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$15.00 to $15.50
Southern coke, No. 2 foundry and 2 soft	14.75 to 15.00
Southern coke, No. 3 foundry	14.25
Southern coke, No. 4 foundry	14.00
Southern gray forge	14.00
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Lake Superior coke No. 1	14.95
Lake Superior coke, No. 2	14.70
Lake Superior coke No. 3	14.45
Basic, Northern	14.45
Standard Southern car wheel	25.25 to 25.50
Lake Superior charcoal	16.75 to 17.25

(By Mail)

Coke.—Daily press reports as to a break in Connellsville furnace coke prices cannot be confirmed at this writing. Representatives of different coke producers generaliy believe that the report is incorrect and call attention to the scarcity of labor in that field just now, which would, in itself, compel oven operators to hold to the present standard established. We continue our previous quotations of $2.40 to $2.50 per net ton at oven for Connellsville 48-hr. coke, for either prompt or last half shipment. Both Wise County and Pocahontas furnace coke is obtainable around $2 to $2.20 per net ton at oven. Foundry coke in all three districts is in a little better demand, although no large sized contracts can be reported. Leading Connellsville and Wise County

brands are quoted around $2.50 to $2.75 per net ton at oven for prompt shipment, with the latter figure inserted in contracts extending into the first quarter of next year. Pocahontas 72-hr. coke can be bought as low as $2.25 at oven for nearby shipment, with about 10c. per ton added on last half business.

Finished Material.—There is an improvement in the local situation, so far as new business is concerned, and there are a number of small sized orders for steel bars and structural material that are being booked by mill agencies, all at the recently advanced prices. Wire nails continue disappointing, but there is a better demand for galvanized sheets. Mill prices on steel bars and structural shapes are 1.25c. and 1.30c., Pittsburgh basis. Local warehouse figures are unchanged around 1.70c. to 1.75c. for steel bars and from 1.80c. to 1.85c. for structural material.

Old Material.—The demand is very light, both from local and outside consumers, and while there has been no change in quotations the market is weak and is liable to go lower at any date. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$9.00 to $9.50
Old iron rails	12.75 to 13.25
Relaying rails, 50 lb. and up	20.00 to 21.00
Rerolling steel rails	11.00 to 11.50
Melting steel rails	10.00 to 10.50
Old car wheels	12.25 to 12.75

Per Net Ton.

No. 1 railroad wrought	$10.50 to $11.00
Cast borings	6.25 to 6.75
Steel turnings	7.00 to 7.50
No. 1 cast scrap	10.75 to 11.75
Burnt scrap	7.50 to 8.00
Old iron axles	16.50 to 17.00
Locomotive tires (smooth inside)	11.75 to 12.25
Pipes and flues	7.00 to 7.50
Malleable scrap	8.50 to 9.00
Railroad tank and sheet scrap	6.50 to 7.00

The Dumhoff & Joyce Company, pig iron merchant, with offices in Cincinnati, Cleveland, Indianapolis, Chicago and other centers, has been appointed sole sales agent west of Pittsburgh for the Wellston Steel & Iron Company, Wellston, Ohio.

Birmingham

BIRMINGHAM, ALA., July 15, 1912.

Pig Iron.—Conditions are about the same as a week to ten days ago. The feature of the first week in July was the sale of 7000 tons by one interest for fourth quarter at $12 a ton. The feature of the second week of July was the sale of 3000 tons more for the same delivery at the same price. This furnace interest could have sold several lots of 400 to 600 tons each at the same figure, but is hesitating to take on any more fourth quarter iron on account of delivering capacity. It is almost out of the market for fourth quarter. Brokers report the sale of small lots for spot delivery at $11.50 and carload lots have gone at $11.75. All fourth quarter business is at $12, with one interest probably shading the price 25 cents in certain instances. The minimum for spot is $11.50 to $11.75, with few furnaces having any on hand. With all stocks on Alabama yards reduced to 100,000 tons, and only one maker having any considerable portion of unsold iron on hand, what may become an iron famine a month or so from now is apprehended. Deliveries are already behind time and becoming more so. Inquiries for fourth-quarter delivery are becoming more numerous. The minimum for spot delivery may be continued as follows:

No. 1 foundry and No. 1 soft	$12.00
No. 2 foundry and No. 2 soft	$11.50 to 11.75
No. 3 foundry	11.00 to 11.25
No. 4 foundry	10.75 to 11.00
Gray forge	10.50 to 10.75
Basic	10.75 to 11.25
Charcoal iron	22.50 to 23.00

Cast-Iron Pipe.—No considerable new business has been reported recently, but a number of small orders have been received and the several plants are being urged to prompt delivery. Manufacturers are as optimistic as they have been for some time, and report a good outlook for new business. Prices f.o.b. Birmingham are as follows: 4 in., $24; 6 to 8 in., $22; 10 in. and up, $21.50, with $1 extra for gas pipe.

Coal and Coke.—The coal market is quiet, with movements lighter than they have been in some time, although orders for delivery nearby and in the early fall are sufficient to insure fair summer operations. Coke is quiet at $3.25 to $3.75 per net ton, f.o.b. ovens, but bids fair to become more active with more active furnace conditions.

Old Material.—There is a good demand for wrought and scrap cast, but in other respects the old material movements of the week were small. Prices f.o.b. cars dealers' yards are quoted as follows:

Wrought iron car axles	$15.00 to $16.00
Old steel axles	13.50 to 14.50
Old iron rails	13.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00
No. 1 country wrought	8.50 to 9.00
No. 2 country wrought	8.00 to 8.50
No. 1 machinery	9.00 to 9.50
No. 1 steel	10.00 to 10.50
Tram car wheels	10.00 to 10.50
Standard car wheels	11.50 to 12.00
Light cast and stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., July 15, 1912.

Increased activity all down the line is reported this week. There is no complaint from any source except as to delayed shipments and prices are more firmly held than ever. Collections are reported good with every evidence that material is going promptly into use and being as promptly paid for.

Pig Iron.—The two outstanding features of the pig iron market have been increased activity and a growing tendency toward a spreading of deliveries. Some consumers are beginning to complain of delays in shipment. The total business of the week has been larger than for some time and among the sales are one of 600 tons, one of 300 tons of No. 2 Southern and a group of orders from one center of 2500 tons about equally divided among Nos. 2 and 3 Southern and Nos 2 and 3 Northern. A sale of 500 tons of malleable is also noted. The total for the week for this immediate territory is likely to run in the vicinity of 10,000 tons of all grades. The inquiries out include one for 800 tons of No. 2 Southern, 3000 tons of No. 2 Southern and 3000 tons of malleable, the latter two from the same source and also 1000 tons of No. 2 Southern. The price is firm at $12 for No. 2 Southern, while Northern is quoted at about $13.75, Ironton basis. No basic is moving at present, nor carwheel iron.

Coke.—A sale of 2500 tons is noted and an inquiry for 2000 tons, with a number of small orders indicating an increasing interest. Not much is doing in 48-hr. coke or in by-product coke.

Old Material.—The scrap market has been rather dull, due to the temporary closing of some of the consuming mills for repairs or for inventory. The mills, however, have orders enough ahead to make them active contenders in the market before long. The Missouri Pacific came out with a second list, this of 1200 tons, closing the present week, and the Vandalia with one of 150 tons. Quotations are fairly firm at the following figures, which are dealers' prices f.o.b. St. Louis:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	12.00 to 12.50
Relaying rails, standard section, subject to inspection	22.50 to 23.00
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50

Per Net Ton.

Iron fish plates	$12.00 to $12.50
Iron car axles	17.00 to 17.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.25 to 11.75
Railway springs	10.00 to 10.50
Locomotive tires, smooth	12.00 to 12.50
No. 1 dealers' forge	8.00 to 8.50
Mixed borings	6.25 to 6.75
No. 1 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.00 to 8.50
Pipes and flues	7.50 to 8.00
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	7.00 to 7.50

Finished Iron and Steel.—The only evidence of slack business is due to the matter of shipments and not to the lack of desire on the part of consumers. Deliveries are becoming so extended that premiums are much talked of and may become a feature of the situation. No large sales are to be reported for the week, but the aggregate is up to the mark and then some. The Monward building plans, for the Commonwealth Trust Company, have come out, but are expected to develop

some redesigning and the actual tonnage is, therefore, not available, but will be around 5000 to 6000 tons. The Burlington is expected in the market soon with inquiries for steel for a contemplated bridge across the Mississippi between St. Louis and Alton, and there are prospects shortly of plans for bridges across the Kaw at Kansas City, Mo, as a result of recent government rulings regarding the river channel. Railroads previously reported as prospective buyers of rails are understood to be awaiting definite information as to ability of mills to deliver before proceeding farther. Track fastenings are firm and active with spreading deliveries bothering the consumer. In plates the best promises are three to four months delivery, a condition which is affecting car orders as well as other lines. Bars are moving rapidly with increasing demand for quick delivery, especially from the wagon industry which has been materially quickened by the reported crop conditions. Light rails are doing fairly well, the chief demand at present coming from the coal interests, though the lumber interests are buying a little.

San Francisco

SAN FRANCISCO, CAL., July 9, 1912.

Specifications on most steel products continued very heavy to the end of June, but since then business has been less active. This is due partly to the holiday and vacation season and the general desire to get a closer view of third quarter conditions before making additional purchases, as well as the fact that immediate needs in most lines are fairly well supplied. A few large orders have been placed for line pipe, rails, etc., and as consuming requirements in the small trades have not been curtailed an early resumption of buying is expected. Difficulty in getting deliveries is steadily increasing and few mill agents will book any business beyond the current month.

Bars.—Arrivals of soft steel bars on last month's specifications are extremely heavy and stocks in local warehouses will be heavier than for some time. Larger supplies are necessary owing to delayed deliveries. Most consumers are fairly covered for nearby requirements and are buying less freely than last month, though a renewed demand is expected within the next fortnight. Jobbers are waiting for this demand to develop before making any large purchases, and orders placed to date are rather light. The tonnage of reinforcing bars is well maintained, some large orders having been placed recently in southern California and several important inquiries are expected in this vicinity. Soft steel bars from store, San Francisco, are quoted at 2.30c. Iron bars are quoted at 2.20c., but are rather easy, and some business is said to have been done at concessions.

Structural Material.—Building conditions in Los Angeles are better than elsewhere on the coast, the valuation of permits for June being $3,488,337. More activity is noted at San Francisco, Oakland and other points than a year ago, though values are not exceptionally high. No new fabricating contracts of much importance are noted, but some mill agents report a very satisfactory movement of plain material. Fabricators here are anxious for new work, but those at Los Angeles are well occupied. The steel work for St. Joseph's Church, about 175 tons, has been let to the Golden Gate Structural Iron Works. Considerable state work is in prospect. The San Francisco Bridge Company has the general contract for Pier 28, and bids will be taken July 19 for the arsenal at Sacramento, Cal., and July 31 for an addition to the state hospital at Agnew, Cal. The Indian Refining Company is figuring on seven steel frame and corrugated iron buildings at Martinez, Cal. The city of Oakland has adopted plans for several additional school buildings. Architectural arrangements for the buildings of the San Francisco civic center, aside from the city hall, will be determined next month. The Pacific States Electric Company has taken the Pacific coast agency for steel towers made by Hubbard & Co., Pittsburgh, Pa.

Rails.—Rail business continues to come out in good shape, both on light and standard sections. There is more activity in the extension of interurban lines than for several years, and at least one good sized order has been placed this month, while small orders are very numerous. Considerable new electric railway development is projected in southern California, and large quantities will probably be required in the electrification of Southern Pacific lines at Portland, Ore. The construction contract has just been let for the completion of the Northwestern Pacific road to Eureka, Cal.

Sheets.—After a short pause at the first of the month new business is again coming out in good shape. Notwithstanding the heavy movement last month few jobbers have large stocks on hand and the distributive movement of black and galvanized sheets is keeping well up to the former volume. Some large consumers have shown anxiety to place contracts covering the third quarter or beyond, but mill agents will take no business beyond July, and some refuse to make any contracts, taking only current orders.

Plates.—Shipbuilding material is rather quiet, the principal job in prospect having been placed East. No large single orders for tank work are reported, but manufacturers are well occupied with general business and the aggregate tonnage is large. A fair volume of new business is coming from merchants, the distributive movement being somewhat better than a month ago.

Merchant Pipe.—Specifications late last month were very heavy, and both merchants and the larger consuming interests are fairly well supplied. There is accordingly some hesitation in entering the market and no heavy orders have been booked as yet. It is no longer possible to get prompt delivery, however, and it will be necessary to keep stocks in better shape than a few months ago. General oil country business is fair, but hardly up to expectations, the advance having little effect on the volume of business. Occasional line pipe inquiries are coming out, but little information is available concerning them. Orders have been placed for about 70 miles of 8-in. pipe, divided between two independent mills. No contracts for merchant pipe extending beyond this month can be placed.

Cast Iron Pipe.—An order for about 800 tons is said to have been placed by a concern at Richmond, Cal., but aside from this the situation remains quiet. Small orders are fairly numerous, but do not make up a very heavy tonnage, and while many municipal projects are developing none has taken the shape of definite inquiries. The city of Vallejo, Cal., is considering the purchase of 10,000 ft. of 4-in. pipe. The city of Honolulu will soon have $265,000 available for waterworks improvements.

Pig Iron.—No contracts of any importance have been placed, though some important business is expected to develop shortly. While foundry operations are not especially active conditions are better than early in the year. The importation of Chinese pig iron has not been resumed, but shipments may be made in the near future. No. 2 Southern foundry iron remains at the former quotation of $22, f.o.b. San Francisco.

Old Material.—Nothing new has developed in the local situation, sales being limited to the demands of local consumers. There is a fair movement of cast iron scrap, but with plenty of material on hand it is impossible to get any advance. Prices are quoted as follows: Cast iron scrap, per net ton, $14; steel melting scrap, per gross ton, $11.50; wrought scrap, per net ton, $12.50 to $15; rerolling rails, per net ton, $11.

Buffalo

BUFFALO, N. Y., July 16, 1912.

Pig Iron.—Market conditions remain generally quiet but inquiry has revived somewhat and sales have been larger than for several weeks past, aggregating nearly 20,000 tons of foundry grades and malleable, principally from New York State and New England foundries, with a small proportion from Canada. Included in this total was one order for several thousand tons foundry grades and one of 3000 tons of malleable for delivery over third and fourth quarters. The sales reported are stated to have been taken at full schedule prices. While the bulk of the iron placed has run in ordinary foundry and malleable grades, quite a number of foundries have bought generously of high silicon, high manganese and ferromanganese irons, charcoal iron, etc. For this season conditions are very encouraging from the producers' point of view. Prices are very strong, with a slight advance noted in some grades. We quote as follows, f.o.b. Buffalo, for current quarter and last half delivery:

No. 1X foundry	$14.25 to $14.75
No. 2X foundry	14.25 to 14.50
No. 2 plain	14.00 to 14.25
No. 3 foundry	14.00
Gray forge	13.75 to 14.00
Malleable	14.25 to 14.75
Basic	14.25 to 14.75
Charcoal, according to brand and analysis	15.75 to 17.50

Finished Iron and Steel.—A steady run of specifications is coming in on contracts in all lines, together with considerable new business. There is no hesitancy to buy at the advanced schedules recently put into

effect, and even some of the larger users are purchasing material outside of their contracts at mills where they can obtain the delivery required. Mills are fairly swamped with orders and deliveries are rather more extended—from three to four months now being required on shapes and plates and four to six weeks on bars. One or two mill agencies report that their mills are not soliciting business, all of their output which they desire to contract for at present prices having been taken. It is understood that some mills manufacturing tin plate and uncoated tin mill products are sold for the remainder of the year and that inquiries of considerable size for uncoated sheets have been declined because of the inability of the mill to take care of additional business without interfering with obligations already incurred. Business in fabricated structural material continues brisk and prices are strong. Bids will be called this week for nearly 1000 tons of steel for the new addition to the Crosby Company's plant, Buffalo, and a little later bids will be taken for the Curtis Brothers store and office building on Franklin street, requiring between 500 and 600 tons. Architects Esenwein & Johnson are completing plans for the Masten Park High School building, Buffalo, requiring about 1200 tons of steel. Metz Brothers were low bidders for an additional factory building for the U. S. Hame Company, Buffalo, in which 200 tons of steel will be used, and the McClintic-Marshall Construction Company has received contract for the addition to the Gould Coupler Company's plant at Depew, N. Y., taking 500 tons.

Old Material.—The market remains inactive. Inquiry from local consumers is of small volume, and there is very little demand from outside districts. Owing to the slackness in inquiry, price schedules have sagged to some extent, the majority of dealers not holding as firmly as they were inclined to a week or two ago. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$12.25 to $12.75
Low phosphorus steel	15.75 to 16.00
No. 1 railroad wrought	12.75 to 13.50
No. 1 railroad and machinery cast scrap	12.50 to 13.25
Old steel axles	16.50 to 17.25
Old iron axles	21.00 to 21.50
Old car wheels	12.50 to 12.75
Railroad malleable	11.50 to 12.25
Boiler plate, sheared	13.75 to 14.25
Locomotive grate bars	11.00 to 11.25
Wrought pipe	9.50 to 10.00
Tank iron	10.00 to 10.25
Wrought iron and soft steel turnings	7.75 to 8.00
Clean cast borings	7.00 to 7.25

Price-Cutting in Bars in Germany

German Iron and Steel Market However Still Generally Strong

BERLIN, July 4, 1912.

The stock markets and the iron trade itself are still occupied in discussing the question whether the iron boom has spent its force. While all furnaces, steel plants and rolling mills are running at their utmost capacity, the price-cutting in steel bars continues and acts to some extent as a damper upon the outlook. It is admitted, too, that a quieter tone has come over the market, new orders being considerably more restricted than some weeks ago. This, however, is apparently due chiefly to the fact that contracts have already been placed for the periods to which sales can, in most cases, be made under the regulations of the various trade combinations. The hopeful fact remains that specifications are coming in rapidly on orders already given, and in many cases with urgent pleading for early shipment. Consumers of pig iron and steel billets are complaining of the scarcity of material.

The market for pig iron is very firm, and while there is not much buying for home account just now, foreign markets are buying very actively. An order for 8,000 tons of hematite has just been taken at good prices from English buyers. Export prices continue upward.

From the Essen district it is reported that the demand for waste and scrap material is very strong; and although large amounts have been coming on the market in winding up the half-year's business, prices are well maintained. From the Silesian district it is reported that the market for scrap material has become firmer. The auction sales of the State railways there in June brought prices 5 to 10 marks above those of June, 1911.

The calls for semi-finished steel material are now brisker than ever before. The mills are in many cases not able to ship in time to meet the wishes of consumers. It is believed, however, that the scarcity of material will be relieved after the big new mills in the Luxemburg-Lorraine district are put into operation. Business in beams and other structural forms is exceedingly active; the export markets are showing a big demand at rising prices.

The bar section, as already intimated above, constitutes the most doubtful point in the general situation. Although home buying is rather slow just now, German consumers are sending in their specifications on order very briskly, and the mills are so fully occupied with work that they are compelled to demand two to three months time for making shipment after specifications have been received. Wrought-iron bars are also finding takers as fast as they can be turned out. The price is 143 marks for commercial forms, with higher prices for special grades. Band-iron continues to be ordered in good amounts, although the mills are already sold out till the end of the year. Manufacturers of cold-rolled bars are also well supplied with orders, but there is less new business coming in than in hot-rolled material. In the plate and sheet trade hardly any change in the situation since the last report can be mentioned, the mills continue to operate at their maximum capacity, and the foreign demand for all grades continues very large.

The Frankfurter Zeitung gives details as to the price-cutting, which it traces in part to a Cologne firm controlled by Krupps, and it draws the obvious inference that it could hardly have been selling at reduced prices without an understanding with that great concern. Similarly the Gelsenkirchen Company is held responsible for the price-cutting of another trading concern. The article concludes by observing that even export prices are now somewhat lower than the high-water mark recently touched.

Some Steel Organizations Unstable

Mills running on skelp have plenty to do, and prices have latterly been tending upward. Work also continues satisfactory in wire rods. Further efforts to prolong the trade organization for this specialty have brought out the fact that the claims for allotments have been unduly increased, so that the existence of the organization is seriously threatened. The various works which put in excessive demands have therefore been called upon to reduce them, and a new meeting will be held at the end of the week. The difficulties, however, are so grave that the dissolution of the combination is probable. An effort is also making to transform into a regular syndicate the heavy plate convention which lapses at the end of this year.

New York

NEW YORK, July 17, 1912.

Pig Iron.—The market has been inactive in the past week and inquiry and new buying are both light. In one case a 1000-ton inquiry has come up for foundry iron for New England delivery in the last quarter of this year and the first quarter of 1913. One considerable inquiry has come up for deliveries desired to cover the entire first half of next year. Furnaces are not anxious to do business so far ahead, however, and the significance of inquiries for deliveries stretching over into 1913 is that buyers feel that they could safely pay today's prices, although these prices represent advances of 75 cents to $1 over what was possible in January and February. Furnace companies, on the other hand, believe that higher prices will be realized for 1913 shipments. In the past week one Lehigh Valley seller has advanced its prices 25c. a ton or to $15.25 at furnace for No. 2X. Iron from that district can still be had, however, at $15, and Lebanon Valley iron sells at somewhat lower than this. Virginia furnaces are more generally adhering to $13.25 at furnace for No. 2X. Buffalo district furnaces are quite well sold into the fourth quarter and some of them practically to the end of the year, and $14 for No. 2X is the usual quotation in that district, while $14.25 is asked for malleable brands. We continue to quote as follows for Northern iron at tidewater: No. 1 foundry, $15.75 to $16; No. 2X, $15.50 to $15.75; No. 2 plain, $15 to $15.25. Southern iron is quoted at $15.75 for No. 1 foundry and $15.50 to $15.75 for No. 2 foundry.

Finished Iron and Steel.—A diminished volume of new business of early promise but firm prices and numerous indications of good business prospects for some time to come spell the present opinion of the local situation. Following closely the announcement of the advance in black and galvanized sheets, it was learned that bar iron products were raised July 16, bolts being advanced about 5 and 2½ per cent. for large and small bolts respectively and nuts and rivets also being higher. Both sheared and universal plates are firm, at least one Eastern mill maintaining a 1.35c. Pittsburgh basis, except for attractive orders for sheared

plates. It is generally admitted that new business is not particularly heavy but good for this season, and even the structural line is holding its own. There is close to 10,000 cars on the market on generally live inquiries, but prices are not much better than obtained some time ago. Quite a little structural work is regarded closed or practically so, including the 13,000 tons for the Adams Express Building to Post & McCord; 950 tons for the Leavitt Building, West Forty-sixth street, to Ravitch Brothers; 2800 tons for an office building, Park avenue and Fortieth street, to Post & McCord; apartment on West End avenue and Eighty-third street, to Hay Foundry & Iron Works; 1500 tons for a high school building of practical arts, Boston, to the New England Structural Company; 300 tons for a building at Springfield, Mass., to the Belmont Bridge Company; 700 tons for a warehouse, Greenwich street, to the Hay Foundry & Iron Works; 400 tons for a building for the Tennessee Power Company to Converse Bridge Company, Chattanooga, Tenn.; 500 tons for the Goerke Building, Newark, to the Alfred E. Norton Company; 800 tons for the Forty-third street viaduct, New York Central, to the American Bridge Company, and 900 tons for a roundhouse and machine shops for the Western Maryland, at Hagerstown and Cumberland, Md.; and 650 tons for coal mine trestles for the Lackawanna Railroad. Of pending work in structural lines may be mentioned some 1500 tons for the Boston City Hall, on which the general contract has been let; an office building at 46 Broad street, 2500 tons, which has come up again, and a number of apartment houses, totaling perhaps 2000 tons. In the railroad car field the American Car & Foundry Company has closed for 1000 steel framed box cars for the Canadian Pacific. The New York Central Lines have inquiries out for 4000 box, 800 general service gondola, 500 flat, 20 coach and 8 postal cars for the Boston & Albany, and the Southern is inquiring for 700 cars. It is understood that the Central Railroad of New Jersey is considering 100 box cars. The Lehigh Coal & Navigation Company wants 175 coal mine cars and the St. Paul 700 to 1000 cars. Of new bridge work mention may be made of 200 tons for Market street, Lynn, Mass., for the Boston & Maine. Quotations are: Steel bars, 1.41c. to 1.46c.; plain structural material and plates, 1.46c. to 1.51c.; bar iron, 1.32c. to 1.37c., all New York; plain material from store, 1.85c. to 1.95c.

Cast-Iron Pipe.—Buying continues largely in 4 and 6-in. pipe and is widespread, not being confined to any one locality. While prices are not quotably higher, some pipe foundries are getting better than the minimum. It is probable that the volume of business is better than it has been for several years. This is a busy season in this line, but there are no public lettings pending. Prices in carload lots are continued at $22 to $23 per net ton, tidewater, for 6-in. in carload lots.

Old Material.—The market is dull, but without special exhibition of weakness. Consumers are showing little interest in further purchases, but deliveries are being received without interruption. In one or two cases the lack of common labor for unloading scrap has been an incident of the week's operations. In heavy melting steel the basis recently prevailing is maintained. We quote dealers' prices per gross ton, New York and vicinity, as follows:

Old girder and T rails for melting	$10.75 to $11.25
Heavy melting steel scrap	10.75 to 11.25
Relaying rails	20.50 to 21.00
Rerolling rails (nominal)	12.50 to 13.00
Iron car axles	20.50 to 21.00
Old steel car axles	15.00 to 15.50
No. 1 railroad wrought	13.25 to 13.75
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	10.75 to 11.25
Light iron	5.00 to 5.25
Cast borings	7.00 to 7.25
Wrought turnings	8.25 to 8.50
Wrought pipe	10.00 to 10.25
Old car wheels	13.00 to 13.50
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.25 to 8.50
Locomotive grate bars	8.75 to 9.25
Malleable cast	10.00 to 10.50

Ferroalloys.—With a considerable amount of inquiry the price of 80 per cent. ferromananese continues at $48.50, Baltimore, for early delivery and into the first half of next year. One company which had inquiries out for 2000 tons, has placed some orders, but is assumed not to have yet entirely filled its requirements. In the West negotiations are under way for 2500 tons. Some sellers declare they are not anxious to sell at $48.50 and believe they can do better in the near future. For 50 per cent. ferrosilicon there also are some inquiries and the price stands unchanged at $72.50 for carload lots and $71.50 for 100 tons or over. Lower figures could be obtained for very large quantities.

Boston

BOSTON, MASS., July 16, 1912.

Old Material.—The market for scrap contains two very encouraging features. The drop in price which usually comes at this season has not materialized, though it was confidently expected. Contracts entailing future deliveries are at least 50 cents a ton higher than the prices asked for immediate shipments. The quotations given below are of prices offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are aproximately 50c. a ton more than dealers' prices.

Heavy melting steel	$10.25 to $10.75
Low phosphorus steel	11.45 to 11.95
Old steel axles	14.00 to 14.50
Old iron axles	17.00 to 18.00
Mixed shafting	13.00 to 13.50
No. 1 wrought and soft steel	10.00 to 10.50
Skeleton (bundled)	8.25 to 8.75
Wrought iron pipe	9.25 to 9.75
Cotton ties	7.75 to 8.25
No. 2 light	4.50 to 5.00
Wrought turnings	7.25 to 7.75
Cast borings	6.25 to 6.75
Machinery, cast	12.50 to 13.00
Malleable	8.75 to 9.25
Grate bars	6.00 to 6.50
Stove plate	8.00 to 8.50
Cast iron car wheels	11.75 to 12.00

Growing Fear of British Pig Iron Scarcity

Renewed Speculative Buying—Record-Breaking Shipbuilding Construction

(*By Cable.*)

MIDDLESBROUGH, ENGLAND, July 17, 1912.

The quarterly meeting at Birmingham on July 11, referred to in last week's cablegram, was satisfactory. The attendance was moderate, but the tone was good. The general opinion of those present was that excellent conditions were insured for the rest of the year. Shipbuilding returns beat records and the tonnage under construction to the end of June exceeds 1,250,000.

There is renewed speculative buying of pig iron, and local English brands have advanced owing to the scarcity. In semi-finished steel there is a fresh demand, following the quarterly meeing, buyers being afraid that there will be a scarcity in the autumn. German sheet bars are easier. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 56s. 10½d., against 56s. 2½d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 57s. 6d., an advance of 9d. in one week.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 17s. 6d.

German 2-in. billets, f.o.b. Antwerp, 100s.

German basic steel bars, f.o.b. Antwerp, £5 17s.

Steel bars, export, f.o.b. Clyde, £7 15s.

Steel joists, 15-in. export, f.o.b. Hull or Grimsby, £6 17s. 6d.

Steel ship plates, Scotch, delivered local yard, £7, 17s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 2s. 6d.

Steel rails, export, f.o.b. works port, £6 7s. 6d. to £6 10s.

Tinplates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 7½d., October-December.

Corrigan, McKinney & Co., Cleveland, Ohio, have sent out inquiries for equipment for their new steel plant in that city. The company is in the market for eight 65-ton furnaces, a 40-in. blooming mill, a 44 x 76 x 60-in. twin tandem blooming mill engine, gas producers, a large number of cranes and other equipment needed for the plant with the exception of the finishing department. Plans have not been completed for the finishing department as it has not been definitely decided as to what the products of this department will be. It is expected that contracts for the equipment for the inquiries that are out will be placed about September 1. Plans will be out shortly for the buildings. It is the intention to commence the erection of the plant during the coming fall.

Metal Market

NEW YORK, July 17, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
July.	Lake.	Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
11	17.37½	17.25	45.00	4.70	4.62½	7.25	7.10
12	17.00	16.75	44.50	4.70	4.62½	7.30	7.15
13	17.00	16.87½	.....	4.70	4.62½	7.30	7.15
15	17.12½	17.00	44.35	4.70	4.60	7.30	7.15
16	17.12½	17.00	44.10	4.70	4.60	7.30	7.15
17	17.12½	17.00	43.62½	4.70	4.60	7.30	7.15

Good sales of copper have been made at prices lower than those quoted by producers, but the market cannot be called active. A large supply of tin is in sight and prices are much lower. Lead is easier. Spelter continues strong. Greater strength is shown by the higher grades of antimony.

New York

Copper.—Despite the recent assurances of copper producers and selling agencies that 17.75c. was a price that would hold, there have been considerable sales at lower prices. In fact it is reported that some of the producers themselves sought a market last week at 17.62½c., but found few or no takers. On the other hand, it is asserted that others of the important producers have stood pat at 17.75c., perhaps for the reason that they have no copper for early delivery. The metal can be had from second hands at around 17c. to-day. In the last half of last week resale lots running into good tonnage were sold at around 16.75c. to 16.87½c. Early this week the market stiffened again, responding to London influences, and 17c. was reached and has been held for what resale copper is offered. In second-hand lots there has been a fair business, the buyers being those who must have the metal for immediate needs, but large consumers have not figured to any considerable extent, although consumption has gone on at a good pace. The accepted solution of the buying inactivity is that the important consumers are covered for the present by supplies bought before copper began to soar. There are those of bullish sentiment who insist that copper will recover all it has lost in the last few days and that despite all charges of "hidden stocks" the statistics are most favorable. Generally speaking it is difficult to find two students of the market who hold the same opinions. Lake copper prices are entirely nominal for the reason that second hands are supposed to hold but little Lake and it is somewhat of a question as to just what figure producers would let it go at. Heretofore they have been asking 17.75c. as with electrolytic. In London the speculative movement in standard copper has continued during the week with irregularity and probably with more influence on American buyers than on American prices. The price of spot copper in London to-day is £75 10s. and of futures £76 2s. 6d. The exports of copper this month total 14,810 tons.

Pig Tin.—Tin prices are at a lower level than they have been in many weeks, which is accounted for by the fact that the supply situation has been relieved by the large quantities of the metal which are in this country or on the way. The effects are now felt of the transshipment of tin from the East to Antwerp and Rotterdam, from which ports it has been forwarded to the United States practically unhampered by the big London dock strike. All the tin that is needed in this country is now available. There has been a fair but not a brisk demand. The United States Steel Corporation was reported a heavy buyer for fall delivery the latter part of last week, but the trade declares it has no confirmation of the transactions. Other large consumers are progressing with supplies previously contracted for. Tin in New York to-day was quoted at 43.62½c. The price of spot in London was quoted at £198 15s. and futures at £196. The arrivals of tin this month reached the total of 3413 tons and there is afloat 2073 tons.

Tin Plates.—The price of 100-lb. coke plates is unchanged at $3.64, with no unusual features in the local trade.

Lead.—There is an abundance of lead available in the New York market, but the demand is very quiet and prices are consequently softer. Independents are asking 4.70c., New York, and 4.60c., St. Louis, while the quotations of the American Smelting & Refining Company continue at 4.75c., New York, and 4.67½c., St. Louis, which of course are subject to shading.

Spelter.—The strength of spelter and the high price of zinc ore continues unabated. Quotations are practically nominal at 7.15c., St. Louis, and 7.30c., New York. At least one large seller, representing a producer, is sold into September at 7.25c., New York. Some September spelter will be available but it will probably be snapped up by large consumers whose needs during the summer months have proved to be greater than was expected.

Antimony.—Although the antimony market is rather quiet as the result of early contracts, Cookson's is stronger and is quoted to-day at 8.25c. Hallett's also has advanced and the price is 7.87½c. Chinese and Hungarian grades are unchanged at 7.37½c. to 7.50c.

Old Metals.—Market is very quiet and prices are only nominal. Selling quotations are corrected as follows:

	Cents per lb.
Copper, heavy and crucible	16.00 to 16.25
Copper, heavy and wire	15.50 to 15.75
Copper, light and bottoms	14.00 to 14.25
Brass, heavy	10.00 to 10.25
Brass, light	8.25 to 8.50
Heavy machine composition	13.00 to 13.25
Clean brass turnings	9.50 to 9.75
Composition turnings	12.00 to 12.50
Lead, heavy	4.40
Lead, tea	4.15
Zinc, scrap	5.50

Chicago

JULY 15.—Notwithstanding a movement in resale copper of considerable magnitude at lower prices, producers quotations have remained unchanged and have shown unexpected strength. Even higher values are now considered quite probable. Tin values are gradually resuming their former level. We quote as follows: Casting copper, 17.50c.; Lake, 17.75c. to 17.87½c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 46c.; small lots, 48c.; lead, desilverized, 4.65c. to 4.70c. for 50-ton lots; corroding, 4.40c. to 4.45c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.20c.; Cookson's antimony, 9c., and other grades, 8.50c. in small lots; sheet zinc is $8.75 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 12.75c.; copper clips, 14c.; red brass, 12c.; yellow brass, 9.25c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 28.50c.; tinfoil, 33c.; block tin pipe, 41c.

St. Louis

JULY 15.—In the metals market there has been decided stiffness, but to-day there came a slight easing of the tension, lead being quoted easier at 4.65c. and spelter at 7.05c. to 7.15c. Tin is quotable at 44.85c., lake copper, 17.10 to 17.35c. and electrolytic copper at 17.00c. to 17.25c. Cookson's antimony remains at 8.35c. The situation in the Joplin ore market was most exciting during the week and in zinc blends all previous records were broken completely. The 60 per cent. metallic content basis reached $61.50 per ton with the choicest lots reaching $65 per ton on this basis. There was a heavy movement at this basis and also at $60 per ton, which was the next step down. The range was down to $54, all grades in consideration. The highest previous basis price for the season was $59 a few weeks ago and 1905 has held the record with $57 up to that time. The top price reached for calamine was $37 per ton, with the 40 per cent. basis ranging between $30 and $31 per ton. Lead ore was stronger at $60 to $61 per ton. On miscellaneous scrap metals we quote: Light brass, 5.50c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; pewter, 21c.; tinfoil, 31c.; zinc, 3.50c.; lead, 3.50c.; tea lead, 3c.

An Advance in Chain.—Last week the leading manufacturers of chain announced an advance of $2 a ton, due to the heavy demand, and the higher prices ruling for raw material. The old and the new prices on chain are given together with the extras:

	Per 100 Lb. Old.	New.
3/16 inch	$7.15	$7.25
¼ inch	4.60	4.70
5/16 inch	3.60	3.70
⅜ inch	3.05	3.15
7/16 inch	2.85	2.95
½ and 9/16 inch	2.65	2.75
¾ and 13/16 inch	2.45	2.55
⅞ and 15/16 inch	2.35	2.45
1 to 1¼ inch	2.25	2.35

Extras.

BB quality, 3/16 and ¼ inch	$1.50
BB quality, 5/16 inch and larger	1.25
BBB quality, 3/16 and ¼ inch	2.00
BBB quality, 5/16 inch and larger	1.75

Iron and Industrial Stocks

NEW YORK, July 17, 1912.

In the week ending July 13 prices of securities in general declined slightly and were uncertain, largely due to the monetary situation, deficiencies in bank reserves having been shown at home and abroad the previous Saturday. The market was further affected adversely by a sharp decline July 12 in Chicago, Milwaukee & St. Paul. Prices took an upward trend July 15, based on the better bank showing of last Saturday and favorable crop reports. As a whole the range of prices has been narrow and trading not heavy. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week follows:

Bald. Loco., com...	55¼- 57	Railway Spring, com.	34 - 35½
Bald. Loco., pref...	105⅞-106	Republic, com.....	25¼- 26¾
Beth. Steel, com....	34 - 36	Republic, pref.....	82⅜- 85
Beth. Steel, pref...	65¾- 69	Sloss, com.	54
Can, com.....	33¾- 37⅛	Sloss, pref.	100
Can, pref.....	116 -117¾	Pipe, com.	19
Car & Fdry., com...	56 - 58	Pipe, pref.	58½- 59⅛
Car & Foundry, pr..	116¾-118	U. S. Steel, com....	67⅛- 69⅜
Colorado Fuel	28¾- 30	U. S. Steel, pref....	110¾-112¼
General Electric.....	176½-178¾	Westinghouse Elec...	75 - 77
Gr. N. Ore Certs...	41¾- 43⅝	Am. Ship, pref.....	102
Int. Harv., com....	117½-119	Chic. Pneu. Tool....	50¾- 51
Int. Pump, com.....	26½- 27⅜	Cambria Steel	43¼- 43¾
Int. Pump, pref....	80 - 81	Lake Sup. Corp.....	32¾- 33⅛
Locomotive, com....	41 - 42½	Pa. Steel, pref.....	96
Nat. En. & St., com.	15¾- 16⅛	Crucible Steel, com..	16⅛- 17⅛
Pittsburgh Steel, pref.....	101½	Crucible Steel, pref..	92½- 93½
Pressed Steel, com..	34¼- 35¼		

Personal

Howard F. Martin, general manager of sales, Pennsylvania Steel Company, Philadelphia, has tendered his resignation, effective August 1. He has been connected with the company for 22 years. President E. C. Felton announces that John C. Jay, Jr., at present New York manager of sales, has been appointed acting general manager of sales, with offices at Philadelphia.

James M. Swank, general manager of the American Iron and Steel Association, Philadelphia, received the felicitations of many friends on Friday, July 12, his 80th birthday anniversary.

Benjamin Nicoll, of B. Nicoll & Co., New York, sails for Europe on the Mauretania July 24.

Charles S. Price, president of the Cambria Steel Company, has been granted a leave of absence by the executive committee of the company to recuperate from an illness brought on by overwork. It is the expectation of Mr. Price's physician that a temporary respite from the responsibilities of his office will result in complete recovery. In the interim Alexander P. Robinson, vice-president, and J. L. Replogle have been appointed to represent the executive committee at the works.

John T. Dickerson, associate member of the American Society of Civil Engineers, has been appointed sales engineer for the Strauss Bascule Bridge Company, Chicago, in charge of Eastern territory, succeeding G. C. Bartram, who has resigned. Mr. Dickerson's headquarters will be in New York. He was associated with the Scherzer Rolling Lift Bridge Company in the engineering and sales department for seven years, prior to which time he was engaged in engineering work for the Burlington, Rock Island and other railroads. He is a graduate of the Rose Polytechnic Institute.

A. C. Jessup recently resumed his position as sales agent for the J. Wood & Bros. Company, Conshohocken, Pa., in the Metropolitan district with an office at 45 Broadway, New York. Mr. Jessup, who has been in the employ of this company for the past 19 years, was compelled to relinquish his duties last September on account of ill health.

O. O. Hewitt, secretary of the Niles Forge & Mfg. Company, Niles, Ohio, has resigned to become assistant manager of the Caldwell Mining Car & Foundry Company, Caldwell, Ohio.

Arthur Windsor Richards, formerly general works manager of Bolckow, Vaughan & Co., Ltd., Middlesbrough, England, has left England for the south of Russia to report upon a large iron and steel works. He will be accompanied by one of the officials of the company. Mr. Richards can be communicated with in his absence through his office at Army and Navy Mansions, Westminster, London, S. W.

F. E. Jamieson, for twenty years connected with the Carnegie Steel Company, Pittsburgh, and for the last few years assistant general agent in the bar and structural division, has resigned. He has not as yet made any definite plans for the future.

R. K. Cheney, formerly connected with the Jones & Laughlin Steel Company, of Pittsburgh, has resigned to accept the position of superintendent of the Sweets Steel Company, Williamsport, Pa.

F. N. Goerner has resigned as assistant district sales manager at St. Louis for the Cambria Steel Company, to go into other business, and J. B. Sharp, formerly with Worth Brothers Company and the Inland Steel Company, has been appointed to the managership vacated by Mr. Goerner.

J. M. Manley, secretary Hisey-Wolf Machine Company, Cincinnati, Ohio, has been appointed treasurer of the Cincinnati branch of the National Metal Trades Association, succeeding the late Emil Von Wyck.

W. A. Stone has been elected president of the Keystone Tube Works, Inc., and his office will be located in Uniontown, Pa.

Prof. Ross C. Purdy, one of the foremost authorities on ceramics in America, has resigned as professor of ceramic engineering at Ohio State University, Columbus, Ohio, and has taken charge of the research laboratories of the Norton Company, Worcester, Mass. The company has paid a great deal of attention to this department of its work in connection with the development of the abrasives, alundum and crystolon, and the new laboratory building will provide even ampler opportunity for carrying on the work. Professor Purdy was formerly president of the American Ceramic Society and is equipped by long experience for his new duties.

George Lee, of the banking house of Lee, Higginson & Co., Boston, Mass., has been made a director of the Reed-Prentice Company, Worcester, Mass., succeeding F. E. Reed, who resigned recently.

Ross R. Harrison, formerly superintendent of the forge department of the Pennsylvania Steel Company, Steelton, Pa., is now associated with the sales and executive forces of the Watson-Stillman Company, 50 Church street, New York.

John Rahn, Jr., president Rahn-Larmon Company, Cincinnati, Ohio, is absent on a business and pleasure trip to the Pacific Coast. He expects to return through Canada.

B. N. Wilson, professor of mechanical engineering, University of Arkansas, Fayetteville, Ark., is making a visit to the different manufacturing centers of the Central West and East with the idea in view of selecting the latest equipment that may be required in several departments of his institution within the near future.

Eugene L. Zimmerman, a prominent business man and capitalist, Cincinnati, Ohio, has been elected president of the Wellston Steel & Iron Company, Wellston, Ohio, succeeding M. L. Sternberger, recently deceased. Mr. Zimmerman has had experience in the manufacture of pig iron and for several years was president of the Cincinnati, Hamilton & Dayton Railroad Company. At the present time he is a director in several other transportation companies.

M. L. Sternberger, a son of the late M. L. Sternberger, has been elected general manager of the Wellston Steel & Iron Company, Wellston, Ohio.

Nelson C. Peebles, formerly associated with Matthew Addy & Co. at Chicago, has resigned to accept the position as purchasing agent for the Edgar Allen Manganese Steel Company, Chicago, succeeding D. Walker Wear.

R. J. Turnbull, has been appointed mechanical superintendent of the Missouri Pacific-Iron Mountain & Southern Railroad. He had been acting superintendent of the eastern division of this road.

T. W. Robinson, first vice-president of the Illinois Steel Company, sailed for Europe last week to be gone about two months.

James Albert Green, president Matthew Addy & Co., Cincinnati, has left on a vacation trip to his summer home at Point Aux Brial, Ont., Canada.

D. B. Meacham, of Rogers, Brown & Co., Cincinnati, is spending the hot season at his summer home in Michigan. He will visit Canada before returning.

C. B. McElhany, formerly assistant manager of sales in charge of wire, Cambria Steel Company, Johnstown, Pa., has been made general manager of sales, Wire Department. Edward Price, Jr., has been made assistant to Mr. McElhany.

Byron T. Gifford, formerly associated with the Central Station Engineering Company, Chicago, has been appointed manager of a recently organized general engineering department of the American District Steam Company, North Tonawanda, N. Y. His offices will be in the First National Bank building, Chicago.

Gilbert H. Pearsall, secretary of Joseph T. Ryerson & Son, Chicago, has been appointed vice-president of the Jacobs-Shupert U. S. Firebox Company, Coatesville, Pa. This association is in addition to Mr. Pearsall's previous connections.

Horace H. Lane, consulting engineer, under whose direction the new car plant of the Haskell Barker Car Company was completed recently, has been engaged to construct the proposed plant of the Eastern Car Company in Nova Scotia.

W. J. Price, of the Fargo Plumbing & Heating Company, Fargo, N. D., has been elected vice-president and treasurer of the Consolidated Engineering Company, Chicago, in which he has acquired an interest.

Obituary

EMIL VON WYCK, aged 47 years, president of the Von Wyck Machine Tool Company, Cincinnati, Ohio, during a period of mental aberration committed suicide July 10. He was formerly an expert chemist and entered the machine tool manufacturing business only about 10 years ago. In his new chosen field he made quite a success, but the past year's dull season, together with the extremely hot weather prevailing, is understood to have upset him mentally, culminating in his untimely end. He was treasurer of the Cincinnati branch, National Metal Trades Association, and at a called meeting of that association a committee was appointed, composed of John W. Neal and James C. Hobart, to draft resolutions extending sympathy to the bereaved members of his family, a widow and one son and a daughter. He was a thirty-second degree Mason and a Shriner, and had numbers of friends in the machine tool business all over the country.

JOHN H. BARTOW, president of the Lake Erie Ore Company, Cleveland, Ohio, died July 10 after an illness of two months, aged 66 years. He located in Cleveland 35 years ago and engaged in business as a vessel broker. Later he became interested in the mines and steamship companies. He was director in the Carter Steamship Company, Cleveland Steamship Company, Salem Iron Company, Salem, Ohio; Erie Steamship Company, Valley Steamship Company and the Valley Transit Company. At one time he was interested in several Michigan mining companies. He is survived by his wife and two daughters.

ISAAC BLOCK, president of the Hyman-Michaels Company, Chicago, died suddenly July 10 at his home in that city, aged 71 years. He had been in the iron business for the past 50 years, formerly living in Cincinnati and being one of the founders of the Block-Pollak Iron Company. He was vice-president of that company until its recent absorption by the Hyman-Michaels Company. He was also one of the organizers of the Standard Forgings Company and a director at one time in the Parkinson-Wilkinson Company and the Laporte Carriage Company. He had been a Mason for nearly 40 years and was interested in various philanthropies.

HARRY VANDERVERE DE HART, of the firm of De Hart & Stafford, iron and steel, 114 Liberty Street, New York, died July 16, at Toms River, N. J., after several months' illness. He was 45 years of age. He was formerly identified with the sales department of the Pennsylvania Steel Company and was successively manager of sales for the Passaic Steel Company and Milliken Brothers.

JOHN J. MANNING, manager of the Toledo, Ohio, plant of the National Malleable Castings Company, was killed on the night of July 12 by the collision of his automobile with a suburban electric railroad car. He was 55 years old. He had charge of the erection of the Toledo plant 22 years ago and had been connected with the company since that time.

Pittsburgh and Vicinity Business Notes

James A. Carey is manager of the warehouse recently established in Pittsburgh by the Hill & Griffith Company, Cincinnati, Ohio. A complete line of foundry facings, supplies and equipment will be carried.

The Warwood Tool Company, Wheeling, W. Va., has built an addition to its warehouse, 32 by 64 ft.

The Mesta Machine Company, Pittsburgh, is building at its works at West Homestead, Pa., a Mesta three-arm pickling machine which will be of the largest capacity it has ever turned out. The company has just installed at the Brooklyn Navy Yard a 400-ton single arm hydraulic forging press of the Haniel & Lueg type.

The Merchant & Evans Company, Philadelphia, manufacturer of tin plate, has started active work on the building of its new plant near Wheeling, W. Va., on the site formerly occupied by the West Virginia Bridge & Construction Company.

The Thomas Carlin's Sons Company, N. S., Pittsburgh, Pa., manufacturer of shears, grinding pans, rolling mill machinery, hoisting engines, contractors' machinery and other equipment, recently shipped to the Pittsburgh Crucible Steel Company, Midland, Pa., the grinding machinery for its open-hearth steel plant, including one 9-ft. dry grinding pan, one 9-ft. self-discharging pan, one 8-ft. standard solid rim wet pan, also one 20 x 12-in. Blake crusher. These machines are fitted for belt drive. The concern also shipped to the Syracuse, N. Y., works of the Crucible Steel Company of America one of its No. 21 direct-acting shears, with a capacity for cutting 1¾ in. square, and to the Boston Iron & Metal Company, Baltimore, Md., one of its No. 18 shears, with a capacity to cut 2¼ in. square.

The Sharon Boiler Works, Sharon, Pa., manufacturer of plate work of all kinds, is building two 200-hp. Morrison water-tube boilers for the National Turpentine & Pulp Company, Greencove Springs, Pa. The boiler is the invention of Egbert R. Morrison, assistant manager of the Sharon Boiler Works.

The Pressed Steel Truck Company, Pittsburgh, has been incorporated to manufacture a new railroad platform and warehouse pressed-steel hand truck, the patent for which is to be issued on July 23. The company has placed an initial order for these trucks with the Pressed Steel Car Company, and it is the intention of the company to continue contracting for the different parts. The only item for which the company is in the market at present is the wooden handles for the trucks. Its offices are located in the Commonwealth building, Pittsburgh, and C. J. Wilson is president.

While the Republic Iron & Steel Company has not come to a definite decision in regard to building by-product coke ovens to supply coke to its blast furnace at Haselton, Ohio, the company is having tests made of various coals in order to determine quantity and quality needed for making high grade coke. The company has sent coking coal to England, also to Germany, the Joliet, Ill., plant of H. Koppers Company and to the Semet-Solvay Company, by-product ovens at Indianapolis. Officials of the company expect to be present when tests of the coals are made and analyses are to be furnished, showing the amount of gas each ton of coal will produce over and above that used in the coking process, as well as ammonia and tar by-products.

The Brownell Company, Dayton, Ohio, manufacturer of engines, boilers, feed water heaters, tanks, etc., has opened an office in room 1418 Oliver building, Pittsburgh, in charge of B. S. Rederer, formerly connected with the Best Mfg. Company at Oakmont, Pa. The company has recently sold James H. Matthews Company through the Tranter Mfg. Company two 90-hp. return tubular boilers, two 150-hp. boilers to the Jenner-Quemahoning Coal Company, for Jerome shaft, at Jerome, Pa.

The Erie City Iron Works, Erie, Pa., through T. H. McGraw, Jr., its Pittsburgh representative, has secured a contract from the Superior Steel Company, Carnegie, Pa., for four 400 hp. horizontal water-tube boilers and for two 300 hp. boilers for the Standard Gauge Steel Company at Beaver Falls, Pa.

The bi-monthly wage settlement between representatives of the Western Bar Iron Association and the Amalgamated Association was made at Youngstown last week, the adjustment being based on a 1.20c. selling price for bar

iron in May and June. The puddlers will receive during July and August $5.85 a ton for boiling and finishers an advance of about 6 per cent.

The Petroleum Iron Works Company, Sharon, Pa., builder of steel plate construction, which is making some additions to its plant, has completed the foundations for a new crane runway, which is now being installed by the Massillon Bridge Company, Massillon, Ohio. The runway will be 75 x 365 ft.

Does Oxy-Acetylene Cutting Injure the Metal?

BY J. F. SPRINGER*

A question in which many users of the process of cutting with the oxygen jet are, or should be, interested relates to any influence which may be exerted upon the material in the vicinity. The temperature of the metal in the actual cut rises to, say, 2700 deg. F., or perhaps even more. The conductivity of steel is pretty high, so that we are not permitted to conclude too quickly that this excessive temperature does not affect the adjacent material. It is of importance to consider results obtained in some experiments abroad.

First, consider the case of a piece of sheet steel about 1.18 in. thick. The carbon content was 0.30 per cent.; silicon, 0.02 per cent. A sample piece was first cut off by a cold process. An oxy-acetylene torch with oxygen jet was then used to make a cut. Two sample pieces were then cut by the cold process from the sheet on one side of the oxygen cut. That is to say, No. 2 was a strip on one side of which the oxygen jet had passed, and No. 3 was a strip taken alongside. These strips had been, one of them, absolutely next the heat; the other, but a short distance away.

Chemical analysis disclosed no alteration in the carbon content. The elastic limit of the piece next the oxygen cut piece No. 2 was found to be 39,601 lb. per square inch, and the ultimate strength 66,570 lb. per square inch. In fact, the elastic limit and the ultimate strength were each a trifle higher than the same qualities of piece No. 1, the piece cut off by cold process before the oxygen cut was made. No. 3, the piece cut parallel to the oxygen cut but at the width of No. 2 from it, had the lowest elastic limit, 38,466 lb., and the highest ultimate strength, 66,936 lb. However, the differences are so small that they could readily be accounted for by local differences in the material apart from the oxygen jet and by errors in the tests. The elongation disclosed by piece No. 1 was somewhat smaller than it was in the case with the other two. In view of the foregoing facts, we are entitled to conclude that the cutting jet of oxygen did not appreciably affect the tensile qualities of the metal in the vicinity.

Another experiment was tried with a piece of cast steel of 0.16 per cent. carbon. The silicon percentage was 0.18. The thickness here was about 5.12 in. A number of test pieces were taken. One of these, No. 4, came from a position alongside an oxygen cut; the others were obtained from points at some little distance. The elastic limit and the ultimate strength of No. 4 were found to be greater than the same properties of every one of the other samples. The values were 34,349 and 51,208 lb. per square inch respectively. Altogether, the results of this experiment are to be understood as disclosing no tensile deterioration in the metal next to the oxygen cut.

A nickel steel was also tested in a similar way. The composition of this steel was, as to carbon, 0.12 per cent.; as to nickel, 4.11 per cent. The thickness was nearly 6 in. (about 59 in.). Rather more than ordinary interest attaches to this case because the nickel steel had been given treatment. One might well consider whether the good effects of this treatment might not be destroyed, at least in the immediate vicinity of an oxygen cut. The tests made of the sample from a point close up to the cut and of others somewhat distant showed that the tensile qualities were practically the same. The carbon content of the nearby sample was a little short of the supposed amount, but it was up to the average of the three distant samples.

Still another experiment was carried out; this time with a hardened nickel-manganese steel. The thickness of the plate was 0.67 in. The chemical constitution here was, as to carbon, 0.25 per cent.; as to manganese, 0.98 per cent.; and as to nickel, 2.84 per cent. Considering the tensile tests as a whole, one draws the conclusion that the oxygen does have an effect for at least the distance of one inch from the cut. To put the results comprehensively, the effect seems to be that of a partial nullification of the hardening treatment. The Brinell test for hardness was also applied, the result being that the reduction of hardness ceased at or before the distance of 1.4 in. from the cut was reached.

Perhaps the foregoing may be summed up thus:

1.—Untreated steel having a combined carbon-silicon percentage less than 0.35 can be cut with the oxygen jet without any change being induced.

2.—Treated nickel steel having a small carbon content is unaffected.

3.—Hardened manganese-nickel steel with a considerable carbon content (say, 0.25 per cent.) is likely to be softened for a distance of 1.4 in.

*Prepared with the co-operation of the Davis-Bournonville Company, New York City.

Meeting of Railway Tool Foremen

The American Railway Tool Foremen's Association held its fourth annual convention at the Hotel Sherman, Chicago, July 9 to 11. The address of welcome was made by Robert A. Quayle.

The following papers were presented and discussed: Standardization of Steel for Small Tools; Milling Cutters and Reamers, Their Formation, Tempering, Etc.; Care of Shop Tools; Checking Systems; Treating of Steel in Electric Furnaces.

In his address of welcome Mr. Quayle in speaking of the emphasis which is now placed upon efficiency as applied to machines, pointed out that behind any mechanical efficiency of methods or equipment was the essential human efficiency out of which the other was created. He also suggested that in the establishment of shop standards for tools care be taken that these standards conform with the general standard in all shops.

For the ensuing year, J. Martin, of the Big Four Railroad, Beech Grove, Indiana, was chosen president and A. R. Davis, of the Central of Georgia Railroad, Macon, Ga. was chosen secretary and treasurer.

In conjunction with the meetings of the association the following members of the supply Association displayed exhibits of shop tools and tool steel: Celfor Tool Company, National Twist Drill & Tool Company, Norton Company, Reed Manufacturing Company, Scully Steel & Iron Company, Chicago Pneumatic Tool Company, Firth Sterling Steel Company, Monarch Pneumatic Tool Company, Joseph T. Ryerson & Son, J. Faessler Manufacturing Company, Crucible Steel Company of America, The Carborundum Company, Cyclops Steel Works, Skinner Chuck Company, Oneida National Chuck Company, Midvale Steel Company, American Specialty Company, Cleveland Pneumatic Tool Company, Whitman & Barnes Mfg. Company, Racine Tool & Machine Company, Standard Tool Company, Independent Pneumatic Tool Company, Colonial Steel Company, Geometric Tool Company.

"Real" and "Unreal" Copper

The Engineering and Mining Journal says: "The exponents of the copper boom are beginning to draw the distinction between the 'real' copper and 'unreal' copper that engages their fancy when the tide turns against their wishes. The copper which certain producers are willing to sell at 17¾c. delivered to buyers' warehouses, with the usual allowances, etc., but don't sell because there are not any buyers at that price, is 'real' copper. The copper that other producers and also 'second hands' are willing to sell at the market in order to convert it into money, and do sell, is 'unreal' copper. 'Second hands' comprise professional speculators, casual speculators and persons who have bought copper for their own use, but for one reason or another may see fit to resell it.

"The series of sensational breaks in the London market indicate that some important persons have made up their minds that the increase in the smelters' production that so mysteriously disappeared—lost, strayed or stolen—is soon to be found. The statistics of the American refiners for June do not throw much light on the situation owing to the interference of strikes, etc. What they show chiefly is that the increase in production, already long overdue, has been still further delayed."

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

DUTY TO GUARD MACHINERY.—The duty under the New York Labor Law to guard machinery exists only where there is reasonable cause to anticipate injury to a workman. (New York Supreme Court, First Appellate Division, Gelder vs. International Ore Treating Company, 134 New York Supplement 782.)

COMPENSATION UNDER EMPLOYMENT CONTRACT.—When an employment contract provides for a reduction of salary during any period when the employer's factory is not "in operation," the plant need not be in full operation to entitle the employee to the higher salary rate; it being sufficient that the factory be running. (Kentucky Court of Appeals, Frankfort Modes Glass Works vs. Arbogast, 145 Southwestern Reporter 1122.)

RESPONSIBILITY FOR MEDDLESOME ACT OF FELLOW EMPLOYEE.—An employer is not liable for injury to a workman caused by a fellow employee's unauthorized and unexpected act in starting a machine. (New York Supreme Court, Second Appellate Division; Ramsay vs. Arbuckle, 132 New York Supplement 579.)

SUFFICIENCY OF PROOF OF DEFECT IN MACHINE.—Sudden starting of a machine, causing injury to a workman, may be found to have resulted from the employer's negligence, though the workman offers no explanation as to how the machine was set in motion, beyond showing that since he did not touch the starting treadle, there must have been some defect in the machine. (Massachustts Supreme Judicial Court, Chiuccariello vs. Campbell, 96 Northeastern Reporter 1101.)

INJURY TO FOUNDRY EMPLOYEE.—A foundry company was not negligent toward an employee who was injured while gas tanks purchased by the company as scrap iron were being broken up by use of a steam hammer, through the presence of ammonia in the tanks, which were supposed to have been empty, though the tanks had been in the scrap pile for two years and had never been inspected. (Alabama Supreme Court, Drew vs. Western Steel Car & Foundry Company, 56 Southern Reporter 995.)

DELAY IN INSTALLING MACHINERY.—If a contract to sell and install machinery does not fix a time for the performance, the seller should comply with his agreement within a reasonable time, and, on his delaying beyond that time, the buyer can recover such damages as will fairly compensate him for loss of the use of the machinery for ordinary purposes, during the delay. (Kentucky Court of Appeals, Hooper vs. Fairbanks, Morse & Co., 143 Southwestern Reporter, 1025.)

DUTY TO READ CONTRACT.—Ordinarily one who signs a contract without reading it is bound by its terms, but he is not bound if he is not negligent and is misled by the other party as to the contents. (Kentucky Court of Appeals, J. M. Case Mill Mfg. Company vs. Vickers, 144 Southwestern Reporter, 76.)

RESPONSIBILITY FOR INJURY CAUSED BY SLIPPERY FLOOR.—A workman cannot recover for injury caused by slipping on a floor and involuntarily throwing his hand in unguarded machinery, if he knew all the surrounding conditions and it was part of his work to keep the floor in proper condition. (United States Circuit Court of Appeals, Second Circuit, Brown vs. Hitritz, 192 Federal Reporter, 528.)

RISK NOT ASSUMED BY STEEL WORKS EMPLOYEE.—A pitman employed in steel works did not assume the risk of being injured through a defect in a pair of tongs or hooks attached to a steel chain on a crane, and used for lifting and moving ingots. (Colorado Court of Appeals, Colorado Fuel & Iron Company vs. Gardner, 121 Pacific Reporter, 680.)

AMOUNT RECOVERABLE FOR PERSONAL INJURY.—A verdict for $2500 for injury to a foundry molder whose left foot was seriously burned by molten iron is not excessive recovery where he lost from 6 to 10 weeks' work, had three physicians, and the injury is permanent and required amputation of a toe. (Kentucky Court of Appeals, Graham vs. Lack Malleable Iron Company, 143 Southwestern Reporter, 1016.)

EMPLOYER'S DUTY CONCERNING HIS WORKMEN'S SAFETY.—An employer need only use ordinary care to provide for the safety of his workmen, he not being an insurer against all defects. (Kentucky Court of Appeals, Shinn Glove Company vs. Sanders, 144 Southwestern Reporter, 11.)

INJURY CAUSED BY DEFECTIVE FASTENING OF CHAINS.—An employer is liable for injury to a workman caused by an unsafe method of fastening a chain in lifting loads, customarily permitted by the employer, though he had issued formal orders to adopt another method. (Wisconsin Supreme Court, Flynn vs. Modern Steel Structural Company, 134 Northwestern Reporter, 1044.)

RESPONSIBILITY FOR INJURY RESULTING FROM WORKMAN'S THOUGHTLESSNESS.—A workman is not entitled to recover for injury due to defective machinery if his own inattention or thoughtlessness contributed directly to the accident. (Alabama Supreme Court, Kilby Frog & Switch Company vs. Jackson, 57 Southern Reporter, 691.)

SURNAME AS TRADE NAME.—Registration of a surname as a trade-mark does not prevent another of that name from using it in a competing business. (United States Circuit Court of Appeals, Second Circuit, Thaddeus Davids Company vs. Davids, 192 Federal Reporter, 915.) But the subsequent user of the name must adopt such addition thereto as will avoid confusion of the products of the competitors in the public mind. (United States Circuit Court of Appeals, Eighth Circuit, Walter Baker & Co. vs. Gray, 192 Federal Reporter, 921.)

LIABILITY OF GAS COMPANY FOR EXPLOSION ON CONSUMER'S PREMISES.—Negligent failure of a gas company's employee to discover or repair a leak in a service pipe, after being ordered to do so, is imputable to the company, so as to charge it with responsibility for injury to a consumer resulting from an explosion. (Indiana Appellate Court, Tyner vs. Southern Indiana Gas Company, 97 Northeastern Reporter, 580.)

FOUNDRY EMPLOYEES AS FELLOW SERVANTS.—One employed in a foundry to operate an electric crane and an electrician engaged in removing grease from the trolley wire were fellow servants in the eyes of the law, relieving their common employer from responsibility for injury to the operator, caused by the electrician carelessly causing a fire in the crane cage. (St. Louis Court of Appeals, Padgett vs. Scullin-Gallagher Iron & Steel Company, 140 Southwestern Reporter, 943.)

DUTY OF MACHINIST TO INSPECT LATHE FOR DEFECTS.—A machinist operating a lathe, without knowledge of defects therein, was not absolutely bound to see if it was in working order, his obligation, as affecting his own safety, being merely to use the same care to discover the defective condition that an ordinarily prudent person would use in the same circumstances. (Texas Court of Civil Appeals, El Paso Foundry & Machine Company vs. Bennett, 141 Southwestern Reporter, 156.)

RESPONSIBILITY FOR INJURY TO BLACKSMITH.—An employer is not liable for injury to a blacksmith while welding iron on an anvil, caused by a piece of the anvil striking him in the eye when his helper misdirected a blow which struck the anvil instead of the piece of iron which was being welded. (New York Supreme Court, Queens County, Dragunatt vs. Transient Development Company, 131 New York Supplement, 961.)

PURCHASE PRICE OF STOCK.—No promise to pay the balance of the par value of stock can be inferred from the mere fact that a purchaser accepted shares and paid 40 per cent. of their face value. (New York Court of Appeals, Milliken vs. Caruso, 98 Northeastern Reporter 493.)

REQUIREMENTS FOR SAFETY OF STEEL MILL EMPLOYEES.—A steel company owes a duty to mill workmen to avoid injury to them, through fall from a roof-shield of skull discharged from the top of a converter. (Pennsylvania Supreme Court, Barry vs. Jones & Laughlin Steel Company, 83 Atlantic Reporter 299.)

LETTER AS WRITTEN CONTRACT.—A letter written by a company acknowledging receipt of an acceptance of an offer of employment at "$2,500 per annum for the first year," but declining to depart from a custom not to make written contracts, is sufficient as a written contract within a statute which requires agreements not to be performed within a year from their making to be reduced to writing. (Connecticut Supreme Court of Errors, Grant vs. New Departure Mfg. Company, 83 Atlantic Reporter 212.)

INJURY CAUSED BY OVERHEAD CRANE.—A workman, injured through a plunger falling from an overhead crane, caused by a cotter pin breaking or working out, is not entitled to recover against the employer, where the pin was in place three hours before the accident, and is not shown to have been worn or defective. (Pennsylvania Supreme Court, Bauman vs. Best Mfg. Company, 83 Atlantic Reporter 293.)

INJURY THROUGH FLYING EMERY DUST.—A workman injured through dust from an emery wheel being cast into his eyes can recover, if the accident resulted from the employer's failure to provide an exhaust fan as required by law. (Indiana Appellate Court, Jenney Electric Mfg. Company vs. Flannery, 98 Northeastern Reporter 424.)

EMPLOYER'S DUTY TO GUARD MACHINERY.—Failure to guard gearing renders an employer liable for consequent injury, unless the surrounding parts of machinery were so located as to afford reasonable protection. (Iowa Supreme Court, Lamb vs. Wagner Mfg. Company, 136 Northwestern Reporter 203.)

The Machinery Markets

Reports from various sections of the country as to the state of the machinery trade are for the most part of a satisfactory character when summer influences are taken into consideration. As has been heretofore stated, business is better than is usual at this season and politics continues to be little or no factor in the situation. In several cities there is a healthy demand for replacement, while the machine tool manufacturers have before them two of the largest lists of requirements ever issued, one representing over $500,000, from the Lima Locomotive Corporation, Lima, Ohio, and that of the Busch-Sulzer Bros.-Diesel Engine Company, referred to last week. In various sections of the country are indications of demand from the railroads for shop equipment which has long been looked for. With New York trade July promises well. New England notes some seasonable slackening up of activity, but railroads there have announced plans for shop improvement and lists are anticipated. Trade in Philadelphia has bettered because of the volume of small orders. Cleveland reports record-breaking sales abroad of automatic screw machinery. Cincinnati has rumors of coming railroad buying, with current business of the small lot kind and the export trade holding up well. There has been a good run of business in Detroit, with an especially good demand for sawmill equipment. The St. Louis trade is considering a small list from the Missouri Pacific Railroad and has a satisfactory scattered business. In the South inquiries have increased, but business is quiet aside from an active call for power equipment. Dredging machinery is in demand in Texas, where it is reported that Mexican activity is increasing. The demand on the Pacific coast is for lumber working and contractors' equipment, trade otherwise being slow.

New York

NEW YORK, July 17, 1912.

Activity in the New York territory continues to be a cause of satisfaction to machinery dealers and manufacturers' representatives. Of course there is no rush but there is an excellent current of business, with several deals pending, a fair volume of new inquiries and with some dealers it already is assured that July will be a "good" month, while with all the prospects are promising. A large part of the business is for replacements, although in some cases the buying is done to increase manufacturing facilities. Some of the New York houses are busy with a list of the Virginian Railway, which will represent an outlay of $65,000, against which orders are now being placed. The list includes engine lathes, milling machines, shapers, planers, grinders, drill presses, two 3-in. turret lathes, a 36-in. car wheel borer and a general list of railway shop equipment, all to be electrically driven. The tools are to supplement the machinery in the new shop of the road at Princeton, W. Va. Another indication of reviving demand for shop equipment on the part of Southern railroads is the appropriation of $40,000 by the Chesapeake & Ohio Railroad for a general list of railroad shop equipment to be delivered at Clifton Forge, Va. Announcement was made in *The Iron Age* January 4 that the Chesapeake & Ohio would be a factor in the market. Purchasers nearer home in the New York market have been the International Type Setting Company, New York, which among other machine tools bought 14 Cincinnati milling machines; the Board of Education of Bayonne, N. J., which invested about $6,000 for the local vocational schools, the purchase including three lathes, a grinder, planer and a Brown & Sharpe milling machine, and the Watson-Stillman Company, New York, which purchased a few tools to increase its facilities.

The Board of Education of Jersey City, N. J., is publishing specifications, on which bids are to be returned by July 25, of a list of foundry machine shop and other equipment needed for its technical high school, for which there already has been extensive buying, particularly of machine tools. The equipment now specified includes a cupola, brass furnaces, core oven, foundry tools, tumbler bell, steel coal and coke bins, machine shop benches, emery grinders which are to be motor driven, centering machines, sensitive drills, relieving attachments for lathes, also pottery equipment, exhaust fan and piping system for the mill room, ranges and ovens for the domestic science department, laundry equipment, etc. It is estimated that the bids will total between $8000 and $10,000.

The New York State Department of Labor in a bulletin just issued states that there is an improved demand for labor this year as against last year, although the betterment is not great. The figures indicate that in thirteen industries or groups of trades the average per diem earnings are higher in nine, of which the metal trades is one. The records of the Bureau of Mediation and Arbitration show that in the first quarter of 1912 there were fewer strikes and lockouts than in the corresponding months of 1911.

Edward Maher's Sons, iron founders of Newark, N. J., are completing the installation of a four ton air furnace to be used in the production of special castings, particularly semi-steel, using oil as the fuel. The furnace was designed by W. N. Best of New York. Since the first of the year the company has installed a Pawling & Harnischfeger ten ton electric traveling crane, a Euclid two ton electric hoist with floor control and a Pridmore 48 x 48 electric jarring machine of 9000 lb. capacity.

The Carborundum Company, Niagara Falls, N. Y., has had plans prepared for a new kiln building, 160 x 200 ft., three stories, and a paper and cloth building, 80 x 206 ft., four stories, of reinforced concrete construction. The general contract has been awarded to the Turner Construction Company, 11 Broadway, New York.

The Blair Furnace Company, Dix, N. Y., has been incorporated with a capital stock of $1,000,000 by G. C. Beach, H. P. Reigart and F. Wolf of New York City.

The Brockfort-Holley Water Company, Brockport, N. Y., has completed plans for the installation of a filtration plant to cost approximately $30,000.

Joseph Zick, 299 State street, has let a contract for the construction of a factory building, 40 x 90 ft., which he will erect on Walnut street.

W. Thomas Wooley, city engineer, Schenectady, N. Y., is preparing plans for a sewage disposal plant to be erected by the city.

The Continental Can Company has completed plans for a new factory building, 200 x 250 ft., which it will erect at Syracuse, N. Y.

The Board of Contract and Supply, Albany, N. Y., is receiving proposals for one open-feed water heater for the Bureau of Water

H. D. Cornwall of Beaver Falls, N. Y., is building a factory, 50 x 100 ft., three stories and basement, at Lewville, N. Y., to cost $20,000.

The Coates Commercial Car Company, Goshen, N. Y., has been incorporated with a capital stock of $250,000 and will manufacture automobiles. The incorporators are R. Gibson, Jr., J. B. Case and P. Crichton of New York City.

The plant of the Bailey-Allen Company, manufacturer of tags, now located at Dansville, N. Y., is to be moved to Caledonia, N. Y., where a new factory building is being erected to be ready for occupancy about August 1.

The Atlas Steel Company, Dunkirk, N. Y., manufacturer of tool steel, etc., has increased its capital stock from $50,000 to $250,000 and the company's plant is to be extensively enlarged.

The Akron Gypsum Company, Binghamton, N. Y., has been incorporated with a capital stock of $200,000 and will establish a plant for the mining and manufacture of gypsum. W. Carver, A. S. Bartlett and M. J. Corbett are the incorporators.

The Seneca Falls Water Company, Seneca Falls, N. Y., has plans in progress for a filter house, 32 x 48 ft., two stories, by Engineer W. G. Stone, Utica, N. Y., who will take bids.

The Wm. A. Rogers Company, Ltd., Niagara Falls, N. Y., manufacturer of silver-plated ware, has plans

completed for a factory and warehouse building, 82 x 700 ft., three stories and basement, which it will add to its plant on Main street.

The Clover Leaf Milling Company, recently organized at Buffalo, has purchased the plant of the Buffalo Foundry Supply Company and will remodel the present building into a feed mill; later a grain elevator will be added.

The Universal Brush Company, Troy, N. Y., will erect a factory building, 30 x 70 ft., at Second street and Ninth avenue.

The Binghamton Lounge Company, Binghamton, N. Y., has let contract for an addition to its factory, which will cost about $35,000.

New England

BOSTON, MASS., July 16, 1912.

The protracted hot weather is having its natural effect upon business, many buyers being absent on vacation or curtailing their working day to get away to cooler environments. In not a few cases extreme heat has compelled the closing of works for the time being. Then again the shop vacation season has arrived and plants are shut down to give working forces the benefit of rest and recreation, while repairs are made and other work done which necessitates cutting off power.

The railroads of New England have signified their requirements for the year. The Central Vermont will enlarge its repair shops at St. Albans, Vt., and it is understood is about to send out a list of requirements comprising a sizable miscellaneous list of machine tools. The Boston & Albany division of the New York Central and the New York, New Haven & Hartford are buying only in small amounts on requisition.

The Boston & Maine is proceeding rapidly with the great locomotive and car repair shops at Billerica, Mass., the erection of the structural steel work having begun. The shops will be ready for occupancy next summer. The machine tool lists are now being prepared. The cranes must be on the ground by March 1. The list of cranes includes the following: Two 65-ton electric traveling cranes, single trolley, with 10-ton auxiliary hoist, 75-ft. span; two 7-ton electric traveling transfer bridges, one 75-ft., the other 40-ft. span, together with a 7-ton electric traveling trolley to operate on them; three 10-ton electric traveling cranes, single trolley, one with 75-ft., two with 37-ft. span; one 35-ton electric traveling crane, 76-ft. span; four 1½-ton pendant control hoists, two with 31-ft. and two with 17-ft. lift; one 2½-ton electric traveling Gentry crane; one 5-ton pneumatic traveling crane; one 10-ton pendant control hand power crane, 58-ft. span.

Gavin & Moriarty, Holyoke, Mass., manufacturers of steam heating apparatus and steamfitters' supplies, have purchased land at Chicopee, Mass., in Willimansett, and will erect a modern factory on the premises in the immediate future.

The Walsh-Standard Store Service Company, which was mentioned last week, is a consolidation of the business of the Standard Mfg. Company, Springfield, Mass., and the Walsh Store Service Company, Syracuse, N. Y. The company will manufacture cable carriers, wire carriers, pneumatic tubes, belt conveyors and other carrier systems. The officers are: President, Edward D. Redfield, Hartford, Conn., president of the City Bank of Hartford; vice-president and sales manager, John J. Walsh; secretary, Warren D. Chase, president and manager of the Rowe Calk Company, Hartford; treasurer and general manager, Louis W. Chism. The headquarters of the company will be at Springfield.

The Bay State Brass Company, Haydenville, Mass., and New York City, has passed into the control of the Haydenville Company, which will continue the plant under separate management. Both concerns manufacture compression and lever handle bibbs for the hardware trade.

The Rivett Lathe & Grinder Company has been incorporated in Massachusetts to succeed the Rivett Lathe Mfg. Company, Faneuil Station, Brighton, Mass. W. H. Shafer, recently superintendent of the Cincinnati-Bickford Tool Company, and secretary of that corporation, is the vice-president and general manager; R. G. Morse, formerly with the General Electric Company, is the treasurer, and G. S. De Lany, formerly a superintendent with the Stevens-Duryea Company, is superintendent. Edward Rivett, founder of the business and widely known as a manufacturer of precision machines of the highest class, is at present in Europe taking a much needed rest, and upon his return in October will assume the duties of president of the company. The new management plans to develop the business in a larger way, continuing the building of lathes and specializing on internal grinding machies, going into sizes larger than those manufactured at the present time at Faneuil, and, in fact, meeting every demand which may arise for this class of grinding machine. Mr. Shafer, the new general manager, is widely known in the machinery business. After 14 years with the American Fire Engine Company, Cincinnati, he went with the Ahrens-Fox Engine Company of the same city, and five years ago became superintendent of the Cincinnati-Bickford Company.

The new plant of the Risdon Tool & Machine Company, Waterbury, Conn., to be erected at Naugatuck, Conn., will be 40 x 128 ft., one story, with a boiler house 20 x 40 ft.

The new factory which the M. Heminway & Sons Silk Company will erect at Watertown, Conn., will consist of a three-story building 52 x 300 ft., a dye house 52 x 82 ft. and a boiler and engine room 52 x 72 ft. Two additional stores 120 x 182 ft. will be built on the spinning mill of the Germania Mills Company, Holyoke, Mass.

R. T. Shumway has been appointed receiver of the business of the Grout Automobile Company, Orange, Mass.

The plant of the Simplex Mfg. Company, Thompsonville, Conn., has been disposed of at trustees' sale to the Extensive Mfg. Company, New York, which will occupy the property for the manufacture of stamp affixing devices.

The Waterville Corporation, Waterbury, Conn., which is building a large works at Waterville, a suburb, for the Chase interests, will erect a power plant building 50 x 111 ft., of brick and steel.

The Waterbury Battery Co., Waterbury, Conn., will build an addition, 35 x 60 ft., one story.

The Manufacturers' Foundry Company, Waterbury, Conn., manufacturer of gray iron castings, is extending its cupola room in preparation for the installation of an additional cupola and blower, contracts for which have been placed.

Philadelphia

PHILADELPHIA, PA., July 17, 1912.

Machine tool merchants generally report business as being materially improved. Orders have not been large individually, but there has been a larger volume of business, made up mostly of small miscellaneous orders, principally for equipment of the medium and smaller type. In one case a sale of a number of lathes is reported, mostly all in single lots. Several small orders for special tools have been placed by some of the railroads, although no business of importance has developed, lists known to have been prepared still being held back. Small inquiries from general buyers are reported as being in somewhat better number and in many cases lead up to business more promptly. Machine tool builders have had a moderate run of new business. The bulk of the demand has, however, been for equipment of a special nature. Some plants are a trifle more active, but few are being operated at a normal capacity. Second-hand machinery merchants report business of a rather irregular nature; buying is scattered and confined to no particular class of equipment. Moderate sales of second-hand boilers, engines, pumps and electrical equipment are reported. Several fair sized as well as a number of smaller inquiries for boilers and engines are pending, but develop into business rather slowly. The foundry trade continues fairly active, gray iron foundries are a little better engaged, while steel casting plants are being urged for deliveries.

The General Refractories Company, Blue Bell, Pa., is taking bids for the construction of a factory building 45 x 73 ft., one story, of steel, brick and concrete from plans by the Hepler Engineering & Construction Company.

The Penn Rivet Company has acquired a factory building at Eleventh and Cambria streets and has been taking bids for the erection of a factory building 70 x 95 ft., one story. Details as to its equipment are not available.

The Lebanon Steel Castings Company, Lebanon, Pa., is enlarging the chipping and molding departments of its foundry by which it will be enabled to double its present output. Additional grinding and cold saw cutting off machinery, purchases of which have already been made, will be installed. The plant, on completion of the improvements, will have a capacity of 50 to 60 tons of crucible steel castings per month.

The Monitor Bi-Loop Radiator Company, Lancaster, Pa., has been incorporated with a capital stock of $500,000 to manufacture boilers, radiators, valves, steam, water and electrical appliances, etc. The incorporators include Samuel D. Stauffer, Lancaster, Pa.; F. J. Vaux, New York; Clayton S. Millinger, Lancaster, and Jacob B. Stauffer, Harrisburg, Pa.

Carl P. Berger, architect and engineer, has practically completed plans for a seven-story addition to the factory of C. F. Rumpp & Sons at 114 to 120 North Fifth street.

M. I. Cooke, director of the Department of Public Works, city of Philadelphia, will take bids until July 24 under contract No. 195 for boilers, blowers and feed pumps for the Queen Lane pumping station: No. 194, 48-in. pipe lines in West Philadelphia; No. 196, for one 36 and two 30-in. stop valves, and No. 201, for a 36 and a 30-in. Venturi meters.

The Hazard Mfg. Company, Wilkes-Barre, Pa., is planning a four-story addition 65 x 75 ft. to its braiding department. Machinery for braiding insulated wire and cables will be installed. All departments of the plant are busy and new business is reported coming in in good volume.

The Philadelphia Rapid Transit Company is planning to erect a power house, one story, 46 x 97 ft., at the northwest corner of Fifteenth and Tucker streets.

Among the articles for the League Island Navy Yard, for which the Bureau of Supplies and Accounts will take bids on July 30, under Schedule No. 4687, are a number of hydraulic jacks.

Reports that the Baldwin Locomotive Works would make large additions to its forge shops at Eddystone, Pa., are denied. It is stated, however, that several steam hammers had been purchased to be installed in the present forge shops.

The Dill & Collins Company is erecting an addition, 45 x 50 ft., two stories, to its power house at Richmond and Tioga streets. The necessary equipment to be installed in the extension has been contracted for.

The Lycoming Foundry & Machine Company, Williamsport, Pa., is building a new aluminum foundry, with a floor 60 x 160 ft., as an addition to its present gray iron foundry, 60 x 300 ft. The company's specialty is automobile engines, and the addition will give it capacity to build 9000 complete motors per year.

Cincinnati

CINCINNATI, OHIO, July 16, 1912.

Although there is more domestic business in sight in the machine tool line, orders from this branch of the trade are confined mainly to single tools. There are a number of rumors afloat indicating that the long anticipated railroad buying will begin soon, but the majority of tool builders do not look for much real improvement in business from the railroads until after the national election is over.

New business with boiler and tank makers is rather slow, but there is an abundance of repair work. Second-hand machinery dealers report no change in conditions as previously reported it being dull for this particular season of the year. Electrical equipment is in excellent demand, and manufacturers of internal combustion engines also have encouraging reports to make.

The export trade continues to hold its own. Among the orders booked within the past month is one for 104 lathes of different kinds from a Belgium motor car manufacturer; the Rahn-Larmon Company was successful bidder on 26 of these tools.

The Lima Locomotive Corporation's List

Local machine tool builders are figuring on the following list of tools wanted by the Lima Locomotive Corporation, Lima, Ohio:

One 72 x 72-in. x 40-ft. planer, motor driven.
One 48 x 48-in. x 12-ft. planer, motor driven.
One triple hand frame slotter, 30 in. clear between bed and rail, motor driven.
One 24-in. crank shaper, motor driven.
One 36 x 36-in. x 10-ft. planer, motor driven.
One 6-ft. motor-driven radial drill.
One 20-in. x 8-ft. lathe, with taper attachments, belt driven.
Two 84 x 84-in. x 14-ft. planers, motor driven.
One 30-in. draw cut shaper, motor driven.
One belt-driven universal grinder, to grind taper not less than 3 in. per ft.
Two 20-in. x 8-ft. engine lathes, with relieving and taper attachment, belt driven.
One 24-in. shaper, with universal tilting table.
One universal milling machine, automatic feeds, table travel 40 in., vertical feed 24 in., cross feed 14 in., belt driven.
One 24, x 48-in. x 16-ft. gap lathe, motor driven.
One 36-in. goose neck drill, motor driven.
One 24-in. goose neck drill, motor driven.
One plain self-grinder, 16 x 72 in., with gap to swing 30 x 14 in., motor driven.
One 2-spindle sensitive drill, spindles about 12 in. apart, ½ in. capacity.
One 18-in. Pond slotter, motor driven.
One 36 x 36-in. x 10-ft. planer, motor driven.
One universal grinder, 10 x 30 in., to grind taper not less than 3 in. per ft.
One 20-in. x 16-ft. lathe, belt driven, taper attachment.
One 16 x 72-in. milling machine, with 42-in. table travel, belt driven.
One 5-ft. motor-driven radial drill.
One 18-in. brass turret lathe.
One belt-driven buffing machine, double-ended spindle, capacity 2 x 18 x 1½ in.
One motor-driven horizontal boring mill, with table 22 x 42 in., 36-in. horizontal feed, 32-in. spindle travel.
One 30-in. x 12-ft. motor-driven lathe, with taper attachment and compound rest.
One 50-ton vertical press, maximum distance between ram and plate, 18 in.
One guide bar grinder, 36-in. cup or eye wheel, platen 2 x 8 ft., motor driven.
One swing grinder, capacity 3 x 18 in., emery wheel to be driven by belt from motor on machine.
One 24 x 48-in. x 17-ft. gap lathe, motor driven.
One 24-in. motor-driven, heavy duty crank shaper.
One 18-in. crank slotter, motor driven.
One 62 x 62-in. x 12-ft. planer, motor driven.
One 20-in. x 8-ft. lathe, belt driven.
One motor-driven knee-type milling machine, table surface 14 x 48 in., travel 39 in.
One 42-in. motor-driven boring mill.
One 6000-lb. double frame steam hammer.
One 4000-lb. double frame steam hammer.
One 2000-lb. single frame steam hammer.
One 1600-lb. single frame steam hammer.
One 2500-lb. single frame steam hammer.
One 9 x 13-ft. oil furnace, two openings 24 x 36 in.
One 9 x 12-ft. oil furnace, two openings 18 x 36 in.
One 7 x 11-ft. oil furnace, two openings 15 x 18 in.
One 6 x 9-ft. oil furnace, two openings 24 in. x 5 ft.
Two 84-in. boring and turning mills, motor driven.
One keyseater, motor driven, capacity 1½ in. through 18 in., for keyseating locomotive wheels.
One 6-ft. radial drill, motor driven, with tapping attachment.
One 12-in. x 10-ft. axle lathe, motor driven.
One 62 x 62-in. x 12-ft. planer, motor driven.
One 90-in. quartering machine, motor driven and complete with boring bars.
One oil tire heating furnace, with capacity of four 84-in. tires.
Two heavy-duty, motor-driven 100-in. wheel lathes.
One 36 x 36-in. x 10-ft. planer, motor driven.
One 18-in. slotting machine, motor driven.
One motor-driven, 5-ft. radial drill, arranged for tapping.
One 16-in. x 8-ft. engine lathe, complete with 14-in. chuck, motor driven.
Two 42-in. vertical milling machines, motor driven.
Two 42-in. x 12-ft. slab milling machines, motor driven.
One 24-in. x 6-ft. slab milling machine, motor driven.
One 50-ton vertical hydraulic press.
One swing grinder, 2 x 18 in., motor driven.
One 26-in. Morton draw cut shaper, motor driven.
Five universal woodworkers' vises.
One lagging crusher, suitable for crushing magnesia blocks.
One band saw, 20-ft. blade, with tilting table.
One 24-in. x 8-ft. belt-driven lathe, with compound rest on carriage and face plate on rear of head stock.
One vertical wood boring machine, 1½-in. capacity.
One 18-in. swing cut-off saw, belt driven.
One vertical power press, capable of forming pipe clamps of ½ x 3-in. iron.
Three 3 x 5-in. oil furnaces, with openings 4 ft. x 6 in.
Two bolt forging machines, motor driven.
One 3-in. shear, capable of shearing 3-in. round bars.
One bulldozer, capable of bending 2 x 6-in. arch bars, 8 ft. long, motor driven.
One 8 x 12-ft. case hardening and heat treating furnace.
One 6-in. capacity cold saw.
One 600-lb. steam hammer.
One 1100-lb. steam hammer.
One 2000-lb. steam hammer.
One eye-bending machine, capable of bending 1¼-in. stock, belt driven.
Fifteen 350-lb. anvils.
One Lassiter bolt-turning machine, motor driven.
One 1¼-in. screw machine, belt driven.
One 36-in. boring mill.
One 4-ft. radial drill, motor driven.
Two 48 x 48-in. x 14-ft. planers.
One 48-in. punch, capacity 1¼-in. holes through 1-in. plate.
Two forges with firepot, coal box and slack tub combined in one frame and two 300-lb. anvils.
One 24-in. head slotter, capable of slotting both ends of a casting 24 x 30 in. x 8 ft., simultaneously, motor driven.
One nut facer, capable of facing ⅝-in. to 1½-in. nuts.
One 750-ton four-flange press.
One hydraulic riveter, 18-in. throat.
One 2-in. Acme bolt cutter.
One 72-in. compression air riveter.

The above list also includes a miscellaneous lot of other shop equipment. The following conditions govern the submission of bids: 1. All bids to be in by July 20. 2. Price on each machine must be made out separately and accompanied by photographs, cuts and specifications. 3. Weight of each tool or machine. 4. Price must be f.o.b. cars, Lima. 5. Delivery date must be specified. 6. Motor driven tools must include cost of motor (current 220-volts D.C.) and the credit given if the Locomotive Corporation decides to furnish the motor. 7. On belt driven machine an estimate of the average maximum horsepower used and all countershaft speed must be given. 8. When foundations are required blue prints of foundation must accompany bids. 9. When the name of any tool manufacturer is mentioned

it is simply intended as an indication as to the type of the tool desired and bids on equivalent tools of other manufacturers will be considered. 10. All tools must conform with Ohio laws as to safety, particularly in regard to gear covers and safety guards.

The Gramm-Bernstein Company, Lima, Ohio, whose incorporation was recently noted, has purchased a factory building at Lima and will add to its equipment for the manufacture of auto trucks.

The Augustine Rotary Power Company, Columbus, Ohio, has changed its name to the Augustine Rotary Mill & Factory Engine Company.

About 2000 tons of cast-iron pipe will be bought by the city of Cincinnati for extension of the waterworks system. V. T. Price, director of Public Service, will open bids July 29.

The Armor Steel Foundry Company, Winton place, Cincinnati, has been forced into the hands of a receiver. As the company's assets are rated at $75,000, with liabilities of only $55,000, it is the general opinion that it will be able to reorganize and operate the plant at an early date. William B. Melish was appointed receiver.

The Cincinnati Butchers' Supply Company has taken out a permit for an addition to its manufacturing plant at 1982-1984 Central avenue.

The Allyn Engineering Company, Second National Bank Building, Cincinnati, has changed its name to the Allyn Company. The firm makes a specialty of designing and erecting manufacturing plants.

The Burkett Agricultural Works, Columbus, Ohio, whose incorporation was recently mentioned, has nearly completed its plant for the manufacture of hay presses and other agricultural implements, and, it is reported, will make some extensions to its factory at an early date.

Invitations for bids on the equipment necessary for a filtration plant will probably be issued at an early date by the city authorities of Newport and Covington, Ky.

The Railway Supply & Mfg. Company, Cincinnati, has let contract for an addition to its plant on Harrison avenue. No additional equipment is required.

Several new boilers will be bought soon by Walter G. Franz, consulting engineer, Cincinnati, for installation in the Union Savings Bank & Trust Company.

The Hess Dustless Mining Machine Company, Ansted, W. Va., has been incorporated with $200,000 capital stock for the purpose of manufacturing mining machinery. Louis F. Hess is named among the incorporators.

The City Council of Grafton, W. Va., will open bids July 29 for furnishing material and equipment for constructing a municipal water and light plant.

Indianapolis

INDIANAPOLIS, IND., July 16, 1912.

Judge Weir of the Superior Court has ordered the sale of the large plant of the Atlas Engine Works in this city July 29 by the receiver, Fred C. Gardner. This was done over the protest of Hugh H. Hanna, Sr., president of the company, who asked that the date of sale be made not less than 60 days from July 12, in order that it might be adequately advertised. The attorneys for the receiver and for the bondholders pressed an early sale because the plant is desired by a large automobile company, not named, employing 5000 to 7000 men and represented by H. C. Smith of Detroit, where the company is now operating a plant. The Detroit company has agreed to the following terms: To pay all general creditors, assume the mortgages against the property. The mercantile accounts, payrolls and expenses, about $80,000, will also be paid. The plant has been operated by a creditors' committee the last four years. The sale July 29 will not be approved by the Court if it finds then a prospect of making a better sale by extending the time.

The Northwestern Can Company's plant, at Brazil, Ind., recently sold by the receiver to John G. H. Klingler, representing local business men, will resume operations on a larger scale than formerly. The reorganization will be known as the Brazil Can Company. It has $50,000 capital stock and the directors are J. H. McClelland, Lewis McNutt, John G. H. Klingler, Prentiss C. Tilley and N. M. Mendenhall. The plant will be enlarged so as to give employment to 200 men.

The Shepherd & Shellhorn Company, Evansville, Ind., has been incorporated with $10,000 capital stock to manufacture stoves. The directors are J. T. Shepherd, C. F. Schelhorn and C. Schelhorn.

The Builders' Supply Mfg. Company has been incorporated at Terre Haute, Ind., with $50,000 capital stock to manufacture builders' supplies. The directors are P. N. Bogart, O. D. Davis and J. R. Connelly.

The Little Wonder Light Company, Terre Haute, Ind., has been incorporated with $10,000 capital stock to manufacture lighting apparatus. The directors are C. Van Slyke, C. P. Walker and H. R. Ihrie.

The Gary Bolt & Screw Company's plant at Gary, Ind., is in operation, Mayor T. E. Knotts touching the electric button that started the machinery in the presence of 5000 people. The plant cost $1,000,000. The number of employees at the start was 250, but it is expected this will be increased to 1200 within a month. John A. Collins is general manager; Edward H. Skemp, superintendent. The first output is 250 tons of nuts, bolts and rivets daily.

The work of building a roundhouse and repair shops for the New York Central Railroad at Terre Haute, Ind., has been begun.

The W. P. Wink Company, Greenfield, Ind., has been incorporated with $10,000 capital stock. The company manufactures window and door screens. The directors are W. P. Wink, O. Busby and E. Busby.

The Interstate Electrical Company has bought the Blue River & Furnas mills near Edinburg, Ind., and will build a power and light plant there, to cost $150,000. It will supply long distance power and light to surrounding towns.

McCaskey & Co., Lansing, Mich., have purchased a site at Petersburg, Ind., for an electric light plant.

Bedford, Ind., has purchased a site upon which to erect an addition to the pumping station of its water plant.

Cleveland

CLEVELAND, OHIO, July 16, 1912.

Interest in the machine tool market is centered in the inquiry of the Lima Locomotive & Machine Company, Lima, Ohio, for a large list of machinery aggregating about $500,000. The general machine tool market is fair. The demand for second-hand machinery continues very good. Manufacturers of general machinery as well as machine tool builders report a good and increasing volume of business. There is a good demand for automatic screw machinery. A local maker reports that the foreign sales of this class of machinery so far this year have broken all former records. In handling equipment the demand for small cranes is very active. Some builders report more orders for locomotive cranes than ever before. Inquiry is good for mining machinery. Considerable new business in steel equipment is in prospect.

The Cleveland Machine & Mfg. Company, now located at 4944 Hamilton avenue, Cleveland, has acquired a new 20-acre site along the Belt Line Railway in the eastern part of Cleveland, formerly Collinwood, on which it will shortly begin the erection of a large plant. R. C. Moodey is president and E. S. Griffiths is secretary and treasurer. E. J. Best on July 1 resigned as chief engineer of the Tennessee Coal, Iron & Railroad Company to become associated with the Cleveland Machine & Mfg. Company and has become its vice-president. It will consist of a main building 200 x 600 ft., a foundry building 100 x 200 ft., a large building for structural purposes, power plant and probably some other small buildings. All the buildings will be of steel construction. In addition to the power plant equipment some machinery equipment will be required. However, the company will make much of its own machinery. The company now manufactures rolling mill equipment. When this plant is placed in operation to its products will be added the manufacture of a complete line of electric cars and locomotives for industrial plants.

A deal has been practically concluded for the merging of the Cleveland Ice Machine Company, Cleveland, and the plant of the Brown-Cochran Company, Lorain, Ohio. A new company will be organized to be known as the Lorain Machine & Mfg. Company, which will occupy the Brown-Cochran plant and manufacture ice making and refrigerating machinery and the Brown gas engine. Those who will be most actively interested in the company are J. B. Hoge, F. E. Wright of Cleveland, the latter president of the Cleveland Ice Machine Company, and Richard Thew and D. D. Lewis, of Lorain. Mr. Hoge will be at the head of the new company and Mr. Lewis will be vice-president. As the plant of the Brown-Cochran Company contains a large amount of machinery equipment it is probable that very little or no new machinery will be required. It is the intention to incorporate the company for $200,000, half common and half preferred stock.

The Frost Wire Fence Company, Lakeside avenue, Cleveland, has increased its capital stock from $20,000 to $100,000 and will shortly begin the erection of a new plant on an east end side near the Belt Line Railway. The company manufactures wire fencing and steel farm gates, using a special galvanizing process on the latter, and does job work of various kinds. The company will erect a main building 80 x 180 ft., a store room 50 x 150 ft. and an office building. The company also has plants at Hamilton and Winnipeg, Canada. H. L. Frost is president and manager, A. R. Gilbert is vice-president and treasurer, J. E. Flynn is secretary and R. W. Doering is sales manager.

The Brown Hoisting Machinery Company, Cleveland, has received an order from the Pittsburgh Coal Company for coal handling equipment to be installed at the company's new plant in Duluth that was completed a few months ago by the same builder. The new equipment, which will considerably enlarge the present plant, will include two single span bridges, each about 600 ft. long, fitted with screening and other equipment. Each bridge will have a man trolley and 230 cu. ft. grab bucket. The contract also includes transformer equipment and buildings in which this equipment will be located.

Plans for a large standpipe for the Youngstown, Ohio, water works system have been completed by the city engineer's department. It will be 100 ft. in diameter and 50 ft. high. It is stated that about 550 tons of steel plate will be used in its construction.

The Noyes Mfg. Company, Dayton, Ohio, is planning the erection of a new power plant.

The Commercial Dairy Machinery Company, 6813 Wade Park avenue, Cleveland, has increased its capital stock from $25,000 to $100,000 and will move into new quarters. The company is planning an extension of its business and desires about five times its present floor space. It will probably occupy quarters in the Bradley Building on West Fourth street. Some new machinery will be added to the machine shop equipment. This will include lathes, drill presses and milling machines. The company makes a complete line of dairy apparatus. William C. Trapp is president, W. C. Tremaine is vice-president and O. J. Parker is secretary and treasurer.

The Clutch Company, Cleveland, Ohio, has been incorporated with a capital stock of $200,000 to manufacture friction clutches, pulleys, lubricating devices, etc. The new company will succeed the Hale-McAdams Wheel Company, 224 High avenue.

The Canton Steel Foundry Company, Canton, Ohio, formerly the Shull Steel Castings & Mfg. Company, will enlarge its plant by the erection of a new moulding building 60 x 180 ft. and an open hearth building 60 x 280 ft. Four new cranes will be added to the six it now has operating, and a new 30-ft. open hearth furnace will be built.

The American Shipbuilding Company, Cleveland, has commenced the erection of a new machine shop in connection with its Lorain, Ohio, plant. The building will be 140 x 250 ft. of steel and reinforced concrete construction.

The Pittsburgh Foundry & Machine Company, Salem, Ohio, will rebuild its plant in that place which was recently burned. The new plant will be of steel construction, about the same capacity as the one destroyed.

Detroit

DETROIT, MICH., July 16, 1912.

The excellent volume of business which has been noted in this market recently was well maintained the past week in spite of the fact that no large transactions were closed. A good run of single tool orders are reported as well as some miscellaneous buying of small lots for replacement purposes. A number of orders for grinding machines have been booked. Inquiry for sawmill equipment continues brisk. Machine shops engaged in the automobile part jobbing trade state that business is very satisfactory, and in many cases shops are being operated at full capacity. Second-hand machinery transactions are of moderate volume, and this class of equipment does not seem to be moving as briskly as new machinery. Engines are in fair demand, some of the installations reported being of large capacity. Steel castings are active and many plants are operating to 70 or 80 per cent. of capacity. Gray iron plants are also well engaged, although there is some complaint that molders are hard to secure. There is a marked quiet in building circles, although old work is keeping contractors fairly busy.

The Gray Motor Company, Detroit, manufacturer of marine and farm engines, which has been operated as a subsidiary of the United States Motor Company, has been taken over by a syndicate headed by O. J. Mulford and H. G. Diefendorf. It is stated that no extensions will be made at present, although the company's business is rapidly increasing.

The Long Mfg. Company, Detroit, maker of automobile radiators, has taken out a building permit covering the erection of a two-story concrete and steel factory building to cost $60,000.

W. J. Hartwig, Detroit, has begun the erection of a two-story machine shop on Fort, near Fourteenth street, to cost about $5,000.

The Timken-Detroit Axle Company, Detroit, denies the reports emanating from Toledo that it would remove its plant to that city. The company is now adding a building 75 x 150 ft. and four stories to its Detroit plant and is installing additional equipment.

The Whitehead & Kales Iron Company, Detroit, will erect an additional factory building 36 x 134 ft., one story, of brick and steel construction.

The Public Lighting Commission of Detroit has awarded a contract to the A. J. Smith Construction Company for the erection of a substation to cost $13,600.

The Imperial Automobile Company, Jackson, Mich., has secured the factory premises formerly occupied by the General Motors Company for the manufacture of motor trucks. The plant occupies seven acres and is completely equipped for the manufacture of automobiles, so that no new machinery will be required at present.

The Kugel Mfg. Company has been organized at Grand Rapids, Mich., with $2,500 capital stock to manufacture furniture. The stockholders are John Kugel, J. A. Friedrich and E. D. Winchester.

The Lion Motor Car Company, Adrian, Mich., whose plant was recently destroyed by fire, has decided to remain in that city. The company has acquired the old plant of Wing & Parsons and will immediately equip it with a full quota of machinery. The new plant will only be occupied temporarily, pending the building of a larger factory.

The Jackson Rim Company has been incorporated at Jackson, Mich., with $100,000 capital stock to manufacture metal automobile rims. The incorporators includes Otis W. Mott of Utica, N. Y., and Winthrop Withington and Mark Merriman of Jackson. A factory will be equipped.

The taxpayers of Marlette, Mich., have authorized the expenditure of $5,000 for waterworks extensions.

J. O. Gilbert, Jackson, Mich., will build a factory 66 x 132 ft. and two stories. It will be equipped for the manufacture of candy.

The Creary Machine Company, Benton Harbor, Mich., has completed its new building and commenced operations. The company is a manufacturer of the smaller locomotive parts and plans the installation of additional machinery in the near future.

The Saginaw Milling Company, Saginaw, Mich., will erect and equip a grain elevator to cost $125,000.

The Apex Horseshoe Company, Albion, Mich., is making alterations to its plant and is now in the market for two 1500-lb. steam drop hammers, 50-ton stamping press, 25-ton stamping press, 5-hp., 440-volt, 60-cycle, three-phase AC. motor, 2-hp., 440-volt, 60-cycle, three-phase AC. motor.

The Central South

LOUISVILLE, KY., July 16, 1912.

Business remains fairly quiet in this market, but the number of inquiries is larger than it has been. The demand for power plant equipment continues better than that for any other single item. Boilers for heating plants are also being sold in numbers, this business forming one of the main factors at present. The demand for electrical machinery is rather featureless just now, few large orders having been placed of late, although there is a good run of scattering business. The interest in oil engines, to which references have been made of late, is said to be increasing.

Definite announcement that the Burley Tobacco Company of Lexington, Ky., will make extensive improvements in its recently acquired Louisville factory was made following an inspection of the plant. The exact wants of the company in the line of machinery have not been defined.

The Graf Stove & Range Company, Louisville, has been incorporated with $100,000 capital stock for the manufacture of stoves and ranges. The company will establish a foundry and begin manufacture in the imme-

diate future. The officers are: Henry J. Graf, president, and Theodore H. Graf, secretary and treasurer.

The Louisville Cottonseed Products Company is to rebuild its plant, recently destroyed by fire. The structure will be of reinforced concrete, and will be equipped with conveyors. No power machinery will be needed. The contracts will be let about August 15. Fred Erhart, Louisville, is architect.

The Eberman Water-works Company, Morgantown, Ky., is in the market for a used 50-hp. automatic steam engine. Henry Eberman is manager of the company.

Following the collapse of the building occupied by J. V. Uppington, Lexington, Ky., as a carriage factory, arrangements are being made for the establishment of the factory elsewhere. Considerable new machinery will be needed.

Floyd, Day & Co., Jackson, Ky., who have purchased a large tract of poplar timber in Letcher County, Ky., from McLin, Milbourne & Co., will build a sawmill near Whitesburg and manufacture the lumber at that point.

The Memphis Street Railway Company, Memphis, Tenn., will build an addition to its power plant. The building will be four stories, of reinforced concrete construction. A battery of boilers with a capacity of 24,000 hp. will be installed, together with 2000-kw. generators.

W. P. Hickerson, Jr., Manchester, Ky., is in the market for machinery for a limestone crushing plant.

The Bonner Furniture Mfg. Company, Nashville, Tenn., has been incorporated with $80,000 capital stock and will establish a furniture factory. A building has been leased and machinery will be installed at once. It will all be motor-driven. T. F. Bonner is president and general manager of the company.

James McClure, Natchez, Miss., is interested in the organization of a company with $50,000 capital stock, which will manufacture a patented harrow.

The Board of Aldermen of Claxton, Ga., will open bids July 25 for furnishing material required for the city waterworks and an electric system. The specifications call for two 750-gal. pumps, two horizontal tubular boilers, one feed water heater and pump, two air compressors and receiver, one high speed automatic engine, one 60-kw. AC. generator and switchboard, fire hydrants, valves, etc.

The Lenoir Car Works, Lenoir City, Tenn., states that the recent reports that it would enlarge its plants are erroneous. The company has not made any plans at this time.

Birmingham

BIRMINGHAM, ALA., July 15, 1912.

Dealers report a steady demand for small mill supplies, engines and boilers. Repair and overhauling work is active. Saw-mills are the best takers of what machinery is being sold. Inquiries for all sorts of machinery and pumps are increasing. Present business is fully up to normal for this time of the year, with the prospect of improvement as autumn approaches. Industrial plants bid fair to be busier during the summer than usual. Altogether the trade is inclined to be somewhat optimistic.

Plans are being prepared for the improvement to the plant of the Empire Oil Company, Cordele, Ga.

The De Soto Ice & Cold Storage Company, Arcadia, Fla., has been incorporated with a capital stock of $50,000. R. S. King is president.

It is announced in Augusta, Ga., that the construction of a power plant on Stevens creek will be begun immediately. It is intended to develop 30,000 hp at a cost of $2,000,000. E. C. Deal is general manager.

The Birmingham Railway, Light & Power Company has made official announcement of $1,000.000 worth of improvements, including horizontal turbine that will have a capacity of 10,000 kw for the central power house; 400,000 ft. of conduit for underground wires; extension of lighting and power system, etc.

The city of Athens, Ala., has contracted for two complete electric light units of 250 hp each. The plant is to be otherwise improved.

The Central of Georgia Railroad is building a creosoting plant at Macon, Ga. Application has been made at Dahlonega, Ga., for the incorporation with $50 000 capital stock of the Coudersport Timber Company to manufacture lumber, etc. The incorporators are: F. A. Raymond, Coudersport, Pa. and others. O. J. Lilly is local representative at Dahlonega.

A. P. Harris and E. M. Curdy, representing the Harris Chair Company, High Point, N. C., are investigating an offer to establish a chair factory at New Decatur, Ala.

Ashcraft, Wilkinson & Co., Florence, Ala., have been incorporated with a capital stock of $50,000 to manufacture fertilizers. M. R. Wilkinson and Lee and John Ashcraft are the incorporators.

J. R. Davis, C. L. Wilson and others are preparing to organize a company with a capital stock of $30,000 at Bartow, Fla., to establish a fertilizer factory.

The American Agricultural Chemical Company, Montgomery, Ala., will rebuild its acid plant that was burned recently. E. R. Taber and W. D. C. Kessler are Montgomery managers of the plant, which has headquarters in New York.

St. Louis

ST. LOUIS, MO., July 15, 1912.

The activity of the machine tool market here is confined to scattering business, but enough of this is developing to keep the dealers in a satisfied state of mind. The chief new interest of the week is a list of tools from the Missouri Pacific which, while not exceptionally large, is sufficient to be attractive to the dealers while still pending. The continued good crop reports are encouraging dealers and there is little likelihood that the political campaign will have any real effect on conditions in this section.

In connection with the extensive list of motor driven machinery the Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, is to purchase, as published in this column last week, it should have been stated that the company will supply its own electrical current, using its Busch-Sulzer Bros.-Diesel engine for generating it. This fact is made interesting in view of the proposal coming from the Keokuk hydro-electric distribution system to provide current at the rate of $20 per kw year.

The Independent Breweries Company of St. Louis has about completed a refinancing proposition involving something more than $5,000,000 of bonds, some of which sum will be used for improving mechanical equipment in the nine plants controlled by the company.

The building at St. Louis formerly occupied by the Belcher Sugar Refinery has been purchased by a Chicago syndicate headed by George W. Stewart and William R. Humphreys which will equip it with one of the largest cold storage mechanical equipments in the West and use it for a public warehouse.

The Mississippi River Power Company, distributor of the hydroelectric power from the Keokuk, Iowa, dam, has completed the purchase of the last 10 miles of private right of way 100 ft. wide into the St. Louis city limits and has begun the construction of a transforming station and the installation of the high power distribution line.

The Wallace Adjustable Bed Company, of Fort Smith, Ark., has removed its headquarters to St. Louis and will remove its plant here or establish a new branch plant.

The St. Louis Board of Education has accepted plans for a new high school building to cost $1,000,000 equipped. It will require considerable ventilating, heating, manual training and other similar equipment.

The plant of the Head-Lipscomb-McCorm Company, Bristol, Tenn., was damaged about $10,000 by fire last week, the machinery principally suffering.

Business men of Muskogee, Okla., are promoting a 20,000-hp. hydroelectric plant in the Grand River near Muskogee, involving an investment of about $2,500,000. They are also endeavoring to obtain for the city a rolling mill to utilize the steel and iron scrap developing in the vicinity.

The National Light & Power Company, St. Louis, has placed $100,000 of bonds, the proceeds to be utilized in equipping a gas plant at Amarillo, Tex.

The Superior-Chicopee Motor Company, St. Louis, with $15,000 capital stock, has been organized by T. H. Burns, George C. Ward and Harry C. Carr to manufacture gasoline motors.

The Erber-Plan Mfg. Company, St. Louis, has been incorporated with $50,000 capital stock by Charles S. Erber, Nathan Plan and I. J. Spieldoch to equip a plant for the manufacture of jewelry for wholesale distribution.

The Sarcoxie Canning Company, Sarcoxie, Mo., with $15,000 capital stock, has been organized by Richard Prigmore, Henry Sabert and J. B. Wild to equip a large canning plant.

The Mohawk Zinc Company, of Pennsylvania, has been authorized to use $15,000 of its capital stock in business at Joplin, Mo., chiefly for the construction and equipment of a mining plant.

The St. Louis Elevator & Grain Company, St. Louis, with $25,000 capital stock, has been organized by Jacob Schreiner, R. J. Pendleton, L. A. Cash and Charles A. Schreiner to equip and operate a grain elevator.

The Arkmo Sawmill Company, of Paulding, Mo., with $100,000 capital, has been incorporated by J. E. Hinchey, John Spillman and J. F. Bottger to build and equip a number of sawmills.

The Pittsboro Gin & Mfg. Company. Pittsboro, Miss., has been incorporated with $10,000 capital stock by C. N. Thorn and Alvin Phillips and will establish a cotton gin there.

The Bomford Electric Company, Hugo, Okla., with $30,000 capital stock, has been incorporated by Wright Bomford, G. Earl Shaffer and John D. Bomford to manufacture electrical devices.

The Bernet, Craft & Kauffman Milling Company, St. Louis, will expend about $25,000 in increasing the capacity of its plant.

The Caddo Cotton Chopper & Implement Company, Caddo, Okla., with $100,000 capital stock, has been incorporated by F. P. Semple, J. W. Crutchfield, J. O. Hartzog and Henry F. Bass to manufacture agricultural implements and will establish a plant at once.

The Clemons Produce Company, Kansas City, Mo., plans the construction of a cold storage plant to cost about $100,000.

The Muskogee Rolling Mill Company, Muskogee, Okla., is preparing for the construction of a $125,000 plant. The Industrial Development Company has an interest in the enterprise.

The Bluebell Mining Company with Frank Chesley president, is preparing to install concentrating machinery on mining property owned by the company.

The I. O. K. Mining Company, Ardmore, Okla., with $25,000 capital stock, has been incorporated by O. A. Lasher and others and will develop property owned by the company.

Clay & Co., Little Rock, Ark., are contemplating the construction of a creosoting plant for railroad ties at Pine Bluff, Ark.

Heber Springs, Ark., is having plans prepared for a water works system, the designers being Dickinson & Watkins, Little Rock, Ark.

Joplin, Mo., will vote August 13 on a bond issue for an extension of the water works system to cover the eastern section of the city. City Engineer A. B. Coke is in charge.

Bids are to be invited soon for a $75,000 water works system for Purcell, Okla., the details being in the hands of E. W. DeLay, city engineer, and the Mayor.

The Beck Rubber Mfg. Company., Edwardsville, Ill., with $50,000 capital stock, has been organized to equip a rubber manufacturing plant. The incorporators are Walter Beck, Emil Wiegand and others.

Texas

AUSTIN, TEXAS, July 13, 1912.

The movement for the formation of additional drainage districts in the lower Rio Grande valley and in the Gulf coast region of Texas promises to bring about the reclamation of large areas of land. Considerable dredging machinery will be required in the carrying out of these projects. This method of adding to the productiveness of the land is meeting with general favor in the semi-arid portions of the state. Prospects for cotton and other crops in Texas continue highly favorable. In Mexico the political situation has materially improved during the last two or three weeks and an increase in the machinery trade there is noted. It is expected that there will be a large demand for various kinds of American machinery, particularly for mines, when complete tranquillity is restored.

The Mission Land Improvement Company will install a 500-hp. pump at its irrigation pumping station near Mission.

The Dehl-Rice Lumber Company of Des Moines, Iowa, contemplates installing a factory at some point in Texas for the manufacture of material for silos.

The Imperial Mercantile Company is installing a 50-ton cold pressed cottonseed oil mill and a 5-stand cotton gin at Sugarland.

The City Council of Sherman has ordered an election of taxpayers to be held July 25 for the purpose of issuing $198,000 of bonds. Of this sum $10,000 is to be used for improvement of the waterworks system, $100,000 for street paving, $75,000 for erecting and improving school buildings and $13,000 for improving the fire department.

The Sutherland Springs Gin Company will install a cotton gin at Sutherland Springs. The incorporators are J. L. Kerr, M. H. Townsend and Semp Russ.

The Daingerfield Cotton Oil Company has increased its capital stock from $20,000 to $40,000 and will make improvements to its plant at Daingerfield, Texas.

Robert McCandlish of Kansas City, Mo., is preparing the plans and specifications for a meat packing plant that is to be erected at El Paso at a cost of about $800,000. It is reported that Swift & Co. of Chicago are back of the project. The site for the proposed buildings and stock pen has been purchased.

McCutcheon Bros. of Balmorhea will construct a system of irrigation for watering a large tract of land in the Toyah Creek valley, near Balmorhea.

The Lone Star Gas Company has completed the survey for the extension of its natural gas pipe line from the Electra district to Sherman. The City Council has granted a franchise to the company to lay a distributing system upon the streets of the city.

The Mercantile Land & Irrigation Company of San Angelo, which has a capital stock of $600,000, is preparing to construct large systems of irrigation in Sutton and Val Verde counties.

The Jefferson Sanitary Sewer Company will construct a sewer system at Jefferson.

The Riesel Gin Company has increased its capital stock from $9,000 to $12,000, and will make improvements to its plant at Riesel.

George H. McFadden & Brothers will erect a cotton compress at Galveston at a cost of $100,000. They have purchased a site for the proposed plant.

J. J. Brown & F. W. Graham of Denver, Colo., will install a concentrating plant upon their mine near Hereford, Ariz.

The Greene-Cananea Consolidated Copper Company will install a 60-ton electric crane and make other important improvements to its smelter at Cananea, State of Sonora, Mexico.

The Pacific Coast

PORTLAND, ORE., July 9, 1912.

Business is very slow to develop from the few large inquiries recently received, but if general industrial activity is maintained on the present scale some improvement is anticipated during the fall. Local machine tool dealers still depend mainly on small orders. The immediate outlook for railroad business is rather uncertain, but several roads are making extensive improvements to their general facilities in this vicinity, and future benefit will doubtless be felt in the machine tool market. The lumber trade throughout the Pacific Coast is steadily improving and scattering orders for mill and woodworking machines, especially of modern high-capacity types, are becoming more numerous. Some inquiries are also coming out from new mill projects.

The movement of contractors' equipment is well maintained and some good sized inquiries are developing for electric and hydroelectric machinery, as well as for water works and irrigating supplies. Industrial concerns are also coming into the market for considerable machinery of various special types.

The Bradshaw-Kimball Company, Inc., is installing a new machine shop at Marshfield, Ore., said to be one of the most complete in that vicinity.

The Toppenish Iron Works, Toppenish Wash., was destroyed by fire late last month. The loss is said to be practically total, amounting to about $10,000, with $3,000 insurance.

The Cornucopia Mine, near Baker City, Ore., has plans for a large addition to its ore mill.

G. W. Cone, this city, is planning to install a sawmill at Ridgefield, Wash.

The Universal Wrench Company, Portland, has started work on a new factory.

A local firm has a contract for an addition to the Hawley Pulp & Paper Company's mill at Oregon City, Ore. The building will cost $80,000 and a lot of new machinery will be installed.

It is reported that the Alaska Shamrock Marble Company will shortly install a polishing plant near this city.

The Yuba Construction Company, operating at Marysville, Cal., has placed orders with the General Electric Company for a 200-hp. motor, six smaller motors, etc., for installation in a river dredge at Sumpter, Ore.

Henry Disston & Sons, saw manufacturers, have established their own office at San Francisco, replacing an agency. E. F. Cooper, sales manager, and D. W. Jenkins, Pacific Coast manager, located at Seattle, were recently in San Francisco supervising the change, and secured quarters at 158 First street. A. E. Kester, for-

merly of the Portland and Seattle offices, will be in charge.

The city of Honolulu, T. H., is preparing to issue $265,000 bonds for water works improvements, and the Board of Public Works will call for bids on the pumping equipment as soon as the money is available.

Monarch Foundry Company, Los Angeles, Cal., has completed its new foundry at Fifty-second street and Santa Fé avenue, and is installing two cupolas of five and eight tons capacity and will make a general line of foundry castings.

Western Malleable Castings Company, 426 Consolidated Realty Building, Los Angeles, Cal., has built a new plant at Fifty-second and Alameda streets in that city. The company will make steel and iron castings, malleable chain links of all sizes and expansion joints for gas and oil pipings. The officers of the company are A. P. Turner, president; Charles A. Post, vice-president; L. Treadway, secretary; William F. Kerr, manager.

Eastern Canada

TORONTO, ONT., July 13, 1912.

Eastern Canada is on the eve of harvest. The grain crops are on the whole better than they were last year. In the prairies of the west there will be a crop of wheat estimated at 250,000,000 bushels, which is about 70,000,000 bushels greater than the largest wheat crop taken off the western fields in former years. The foundation conditions of trade are excellent. It is predicted by some shrewd men of affairs that the trade of Canada in the fiscal year which began April 1 will very greatly exceed the trade of the country for any former year. Everything is being put on a larger scale. It is remarkable how rapidly quite recent adjustments to the progress of the country have been outgrown and have had to be replaced by larger arrangements. This is very notable in industrial plants, which are being made greater and greater in many conspicuous cases. There seems to be no rest in the forward movement. This country is taking machinery and equipment at a rapid rate, and there is every indication that this will continue.

The property owning ratepayers of Fort William have approved the by-law embodying the agreement between the municipal corporation and the Canada Car Works Company. The construction of the company's big plant will therefore be proceeded with without delay.

I. A. Kilpatrick, general manager of the Canadian Iron Corporation, states that the company will spend between $150,000 and $200,000 in enlarging the Fort William plant under plans which have been approved by the directors of the corporation as soon as the car works by-law is approved.

W. H. C. Burnett, industrial agent, Detroit, was in Hamilton, Ont., recently to look over some phases of the possibility of two large American concerns locating branches there. One has a capital stock of over $2,000,000 and the other runs a close second to that. If the location is suitable they will erect immense plants in the east end of the city and will at the outset employ at least 3000 men before the end of two years.

The Finch Pruyn Company will erect a large pulp and paper plant at St. Flavian, Que.

The Canada Brick Company has begun operations at its new plant at St. Lambert, Que.

The Georgetown Foundry Company, Georgetown, Ont., proposes to erect a foundry there if the town will grant certain privileges.

The Northern Bolt & Screw Company, Owen Sound, Ont., is about to begin the construction of a factory.

The Sherbrooke Iron Works, Ltd., Sherbrooke, Que., is preparing plans for a new foundry, boiler and machine shop.

The Otis Fenson Electric Company will build a factory in Hamilton, Ont.

Price Bros. Company will build a large pulp mill at Ionquiere, Que.

Jos. MacLean & Sons, Renfrew, Ont., will erect an automobile factory there.

The Open Book Rest Company of Canada, Ltd., Hamilton, has been incorporated with a capital stock of $100,000 to manufacture and deal in all kinds of materials and supplies for use in connection with telephone service and equipment.

By a majority of 196 the ratepayers of Berlin, Ont., carried the by-law to grant the Consolidated Rubber Company a bonus of $25,000 and minor concessions on condition that it erect a $250,000 plant for the manufacture of automobile tires and accessories.

The Imperial Car Company has purchased a site on the Tuckett farm on the Beach road, Hamilton, Ont.

Hamilton, Ont., is to have a new canning industry. The company has just been incorporated by letters patent granted to Malcolm Glassco and Reginald Glassco, of Hamilton; George Belmont Jacobs, of Oakville; Ernest Glassco, of Toronto; William Joseph Morrison, of Atlanta, Ga. The firm name will be Glassco, Ltd., and the capital stock $100,000.

The Board of Control, Hamilton, Ont., is receiving tenders for delivering and erecting in the high level pumping station, Hamilton, four units of synchronous motors for direct connection to turbine pumps, with switching apparatus and accessories complete; also for four units of turbine pumps, each of a capacity of 1,000,000 gal. per 24 hours for direct connection to synchronous motors.

The Ontario Engine Company, Ltd., Toronto, Can., has been incorporated with a capital stock of $100,000 to manufacture engines. The provisional directors are James M. Donahue, S. W. C. Scott and Hamilton T. Hunter.

The National Iron Works Company, Ltd., Toronto, Gordon F. Perry, general manager, is taking bids for an addition to its cast iron pipe foundry estimated to cost $250,000.

The Bawden Machine Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000. George H. Sedgewick, Austin G. Ross and Lionel Davis, Toronto, are the directors.

The Laurentide Paper Company, whose works are at Grand' Mère, Que., is preparing to add to its plant power works for the addition of 50,000 hp. to its output.

The Imperial Car Company, a $6,000,000 concern, and branch of the Mager Car Works, Passaic, N. J., will erect a $1,000,000 plant here, and will employ 800 hands. The following local men subscribed $250,000 to the capital: Sir John M. Gibson, Hon. J. S. Hendrie, J. R. Moodie, W. C. Hawkins, Cyrus A. Birge, George Hope, C. S. Wilcox, J. J. Scott, K. C., J. F. Levy, J. W. Sutherland and William Southam. Among the directors are W. G. Rose, Montreal, director of the Dominion Steel & Iron Company; G. H. Cahan, K. C., Montreal; Sir Henry Pellatt, and Basil Mager, Passaic. Mr. Mager, formerly of Montreal, will be general manager. A 50-acre site has been acquired.

The Hamilton Gear & Machine Company has secured a permit to erect a $2,500 one-story machine shop in Toronto.

Western Canada

WINNIPEG, MAN., July 11, 1912.

The movement of machinery continues in satisfactory volume. Supply houses are quite active filling contracts for mill machinery, heating goods, waterworks requirements, elevators, etc. The iron and steel companies are having one of the best seasons in the history of this country. The local foundries are all busy.

The recent cyclone disaster at Regina, Sask., did considerable damage to some industrial plants and there is much repairing and replacing of machinery to be done as a result. Among the losses are the following: The Capital City Flour Mills, $10,000; the Grant Company's grain elevator, $5,000; the B. C. Sugar Company, $35,000; the Regina Storage & Forwarding Company, $40,000.

Parrish & Heimbecker, grain merchants, will erect a terminal grain elevator at Fort William with a capacity of 90,000 bushels.

J. S. Deschamps, who operates a sawmill and woodworking factory at Rossland, B. C., is about to build a new planing mill and will install several up-to-date machines.

W. A. Brewer, of Mount Lehman, Fraser Valley, B. C., is erecting a small sawmill in the Hope, B. C., district.

The Small & Bucklin Lumber Company, Ltd., New Westminster, B. C., contemplates extensive additions to its planing mill equipment.

James Leigh & Son, sawmillers, Victoria, B. C., will install an electric plant capable of generating 200 16-cp. lights.

The Reliance Sash & Door Company, Ltd., Vancouver, is still adding to its equipment. At present special automatic boring and gluing machines are being installed. Another large building for the company is in course of construction.

The Standard & Chemical Company, of Toronto, will build a pulp and paper mill at MacLeod, Alberta.

The Camrose Clay & Lumber Company, Ltd., a

subsidiary company of the Canadian Development Company, of London, England, has been formed to operate a dry pressed brick plant in the vicinity of Camrose, Alberta. It will also operate a sash and door factory and planing mill. Work on the installation of the plant will commence this summer.

The McLelan Lumber Company, Ltd., comprising Vancouver and eastern Canada capital, is building a sawmill at Ladner, B. C. A planing mill and box factory will form part of the plant.

Plans are being prepared for a factory to be built at Eburne, B. C., for the Coops Piano Mfg. Company, Tacoma, Wash.

The West Kootenay Power & Light Company, Ltd., Bonnington Falls, B. C., will install an 8000-hp. generating unit.

The Western Foundry & Machinery Company, Edmonton, Alberta, will erect a machine shop to cost $60,000 and is now calling for tenders.

The Grigg Mfg. Company, whose head office is in Minneapolis, will build a $100,000 implement factory in East Kildonan, Man.

The City Commissioners of Edmonton, Alberta, will receive tenders for supplying an artificial gas plant.

Chicago

CHICAGO, ILL., July 13, 1912.

Following a month of unusually active machine tool business in June, the first two weeks of July have fallen somewhat behind. The number of railroad inquiries still pending, however, together with a very general inquiry of miscellaneous character, gives promise of an average volume of business before the month is over. The Arnold Company, Chicago, engineer for the Algoma Central & Hudson Bay Railway Company, in the construction of its new yards at Tagona, are asking for figures on the following list of tools:

One 75-in. driving wheel lathe.
One 42-in. boring mill.
One 36-in. triple geared lathe.
One 24 x 12-in. engine lathe.
One 16 x 6-in. engine lathe.
One 2 x 24 in. turret lathe.
One 12 x 6-in. toolmaker lathe.
One brass lathe.
One cutter and reamer grinder.
One 18-in. slotting machine.
One 18-in. shaping machine.
One No. 2 milling machine.
One 66-in. radial drill.
One sensitive drill.
One twist drill grinder.
One 4-in. centering machine.
One pipe bending machine.
One 600-ft. air compressor.
One 42-in. throat punch and shear.
One 12-in. bending roll.
One pneumatic flue roller.
Two air hammers.
Two air drills.
One 30-in. drill press.
One 75-in. hydraulic wheel press.
One flue furnace.
One spring and case hardening furnace.
One flange furnace.
One rivet forge.
One flue roller.
Two emery wheel grinders.
One power hack saw.

The Jorn Sand Blast Company, North Chicago, has let the contract for a new factory building to be erected at North Chicago and to be 50 x 180 ft.

The Safety Equipment Mfg. Company, Chicago, is preparing to build a machine shop and brass foundry, both one story, and the former to be 40 x 125 ft. and the latter 35 x 50 ft.

The Big Four Railroad is taking figures for the erection and equipment of a roundhouse to be built at Hillsboro, Ill., upon which an expenditure of $65,000 will be made

The Viking Pump Company, Cedar Falls, Ia., has under contemplation the building of a new factory at Chicago. Plans have been prepared.

The Joliet Silo & Mfg. Company, Joliet, Ill., has been incorporated with a capital stock of $50,000 by Frank H. Kieth, A A. Parks, N. E. Farley, William Niccols, and L. A. Gesler. The company will manufacture silos and other wood and metal products.

The E. F. Mees Mfg. Company, Milwaukee, Wis., has been organized by E. F. Mees, Edward Elkhart and Oscar Gerlach, with a capital of $25,000.

The Loop Nut Mfg. Company, Madison, Wis., suffered a loss of $12,000 as a result of a fire July 8.

H. S. Brackett, 925 Winona avenue, Chicago, is building a two-story public garage, to be 75 x 125 ft.

The Rockford Iron & Steel Company, 307 South Main street, Rockford, Ill., has been incorporated with George A. Rubin, president; A. A. Rotstein, vice-president; J. L. Rubin, secretary and treasurer.

The American Safety Valve Company, Chicago, has been organized with a capital stock of $300,000 by N. P. Bigelow, L. T. Walker and Channing L. Sentz. The new company will manufacture electrical and other machinery.

The Schmitz Mfg. Company, Chicago, has been organized with a capital of $10,000 to engage in the manufacture of dies, tools and machinery. The directors are Henry Koller, Murdock Campbell and Ernest Schmitz.

William Haberkamp Machine Works, Chicago, has been organized with a capital stock of $5,000 to operate a general machine and repair shop. The directors are W. H. Haberkamp, J. M. Haberkamp and W. C. Haberkamp.

The Vulcan Engineering Sales Company, Chicago, reports that in the last 60 days it has booked an unusually large number of orders for Hanna riveters. The majority of these machines are for heavy work and will be shipped to both domestic and foreign users. The company now has on its books open orders for 55 riveters of various sizes.

The Lake Erie & Western Railroad is to make improvements in the facilities of its Rankin, Ill., shops and add to the power equipment.

Government Purchases

WASHINGTON, D. C., July 15, 1912.

The Paymaster General, Navy Department, Washington, will open bids August 6 for furnishing two centrifugal air compressors, single stage, motor driven, and two centrifugal motor driven blowers under schedule 4689; four ash ejector pumps for the United States battleship New York, schedule 4691; one complete outfit of laundry machinery, schedule 4696.

The Paymaster General, Navy Department, Washington, will open bids July 30 for a quantity of hydraulic jacks. Detailed information can be had by applying for schedules 4678, 4685 and 4686.

The United States Engineer Office, Federal Building, Detroit, Mich., will open bids July 25 for machinery and valves for the new lock at St. Marys Falls Canal, Sault Ste. Marie.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids July 6 for furnishing four electrically and 18 hand operated traveling cranes for the naval station at Pearl Harbor, Haawii, as follows:

Item 1, all cranes complete—Bidder, Whiting Foundry & Equipment Company, Chicago, Ill., $34,822; Manning, Maxwell & Moore, New York, $39,360.

Item 2, four electric cranes as specified—Bidder, Niles Bement-Pond Company, New York, $26 240 and $24,840; Morgan Engineering Company, Alliance, Ohio, $35,985, under modified specifications; Cleveland Crane & Engineering Company, Wickliffe, Ohio, $30,620; Pawling & Harnischfeger Company, Milwaukee, Wis., $31,000; Whiting Foundry & Equipment Company, Chicago, Ill., $30,484; Manning, Maxwell & Moore, New York, $36,154 and $33,049, alternate or $26,732.

Item 3, 18 hand operated cranes—Bidder, Cleveland Crane & Engineering Company, Wickliffe, Ohio, $3,980; Chisholm & Moore Mfg. Company, Cleveland, Ohio, $3,420; Pawling & Harnischfeger Company, Milwaukee, Wis., $6,400; Whiting Foundry & Equipment Company, Chicago, Ill., $5,418; Manning, Maxwell & Moore, New York, $4,756 and $4,418, alternate.

Trade Publications

Tropenas Converters.—Tropenas Converter Company, 50 Church Street, New York. Booklet. Size, 6 x 9 in.; pages, 24. Devoted mainly to a brief illustrated history of the Panama Canal, incidentally telling of the uses made of the Tropenas converter in the Canal Zone.

Pneumatic Tools.—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Catalogue No. 9. Size, 6 x 9 in.; pages, 118. Devoted to Thor pneumatic tools of all descriptions. Is profusely illustrated and directs particular attention to late improvements in the Thor tools, and contains specifications and export data.

Handling Machinery.—C. W. Hunt Company, West New Brighton, Staten Island, N. Y. Deals with labor saving machinery, such as coal and contractors' tubs, buckets, hoisting and handling machinery, all of which are illustrated.

Air Drilling Machines.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Folder No. 102. Presents with illustrations the features of the Little Giant ball bearing portable air drilling machines.

Liquid for Hydraulic Tools.—Watson-Stillman Company, 190 Fulton street, New York. Folder. Refers to a filling fluid called Jackohol for hydraulic tools that does not freeze, thicken, gum or change chemical composition, and is protective to metal surfaces and packings. Directs attention to bulletin J, which is sent on request, and also deals with Jackohol.

Tanks.—Hamburg Boiler Works, Hamburg, Pa. Catalogue and price list No. 4. Size, 3¾ x 8 in.; pages, 24. Deals with the Hamburg tanks, several of which are illustrated. Information is given on containers for water, gas and air, as well as rules for ascertaining the safe working pressure of steel tanks or plate steel drums and of dished heads.

Holdback Dogs.—Ready Tool Company, Bridgeport, Conn. Folder. Illustrates and points out the features of the new Hill holdback or face plate dog for holding work to the head center when the tailstock center cannot be used, and which is intended for use with a steady rest. Also explains the Hill tool makers' lathe dog which combines the advantages of the ordinary one screw dog and the clamp dog and the Red-e boring bar.

Turbine Water Wheels.—J. & W. Jolly, Inc., Holyoke, Mass. Catalogue. Size, 5½ x 7½ in.; pages, 96. The illustrations and descriptive matter set forth the features of the McCormick turbine water wheels and accessory hydraulic power machinery. The catalogue also contains rules for the measurement of water, hydraulic formulae and various tables of value to the engineer.

Continuous Coal Cutters.—Sullivan Machinery Company, 122 South Michigan avenue, Chicago, Ill. Bulletin No. 63F, replacing 63C. (Fifth edition.) Pages, 31. Descriptive of the use of the Sullivan continuous coal cutter for undermining coal in room and pillar mines with code for convenience in ordering and other data. The operation of the machine is illustrated.

Electrical Equipment for Iron and Steel Mills.—General Electric Company, Schenectady, N. Y. Bulletin No. 4923. Size, 8 x 10½ in.; pages, 72. Devoted to electrical equipment for iron and steel mills, such as generating and transforming apparatus for steel mills, distribution of power for steel plants, motors for heavy service and other apparatus.

Beam Shearing and Cutting Machines.—Wiener Machinery Company, 50 Church street, New York. Catalogue No. 101. Size, 9 x 12 in.; pages, 32. Describes and illustrates the S and M heavy duty beam shear and coping machines, and bar and angle cutting machines, of which Schulze & Naumann, Coethen-Anhalt, are the manufacturers. Capacities, dimensions and weights of the various machines are given, as well as code words.

Transformers.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Descriptive leaflet No. 2496. Describes an outdoor type of oil insulated self-cooling transformer which is of the same construction as the unit built for indoor service with the additional features necessary for outdoor insulation. Constructional details are dwelt upon and several views of outdoor installations are shown.

Muffle Furnaces.—Hoskins Mfg. Company, 453 Lawton avenue, Detroit, Mich. Bulletin No. 10. Relates to the type FC electric muffle furnace for the heat treatment of tool steel. The construction and operation of these furnaces is described at some length. Data on the results obtained in operation are given and a partial list of users is included.

Steel Valves and Fittings.—Nelson Valve Company, Philadelphia, Pa. Catalogue S. Replaces the steel valve and fitting list and the steel valve drilling list in the company's 1909 catalogue. A number of new valves for use in power plant work are illustrated and briefly described together with dimension tables.

Concrete Mixer.—Standard Scale & Supply Co., 243 Water street, Pittsburgh, Pa. Bulletin Y-50. Treats of the Standard low charging concrete mixer and the various accessories such as scales, steam engines and boilers, gasoline engines, contractors' hoists, wheelbarrows, carts, trucks, etc., used in connection with it. An illustrated description of the mixer appeared in *The Iron Age*, November 24, 1910.

Tanks.—William B. Scaife & Sons Company, Pittsburgh, Pa. Catalogue No. 12. Concerned with a line of steel tanks for air, gas and liquids. These are made in a number of different sizes and styles, all of which are illustrated and briefly described. Several tables of useful information are included.

Pneumatic Tools.—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Circular B. Deals with a line of pneumatic tools which include roller bearing and piston drilling machines, pneumatic grinding machines, reversible wood boring machines and hammers for chipping and calking, light riveting and driving staybolts. All of these are illustrated and brief specification tables are included.

Engines and Boilers.—Southern Engine & Boiler Works, Jackson, Tenn. Circular. Illustrates the various types of stationary and portable steam and gasoline engines and boilers made by this company.

Internal Combustion Engines.—Wisconsin Engine Company, Corliss, Wis. Pamphlet. Pertains to the Adams Wisconsin kerosene gas engines, which are built in five sizes, ranging from 50 to 200 hp. The engine is illustrated and there is a brief description of the salient feature of its construction.

Transmission Chain and Sprockets.—Baldwin Chain & Mfg. Company, 199 Chandler street, Worcester, Mass. Catalogue. Illustrates the various types of chains made for the transmission of power. Instructions on the care and use of chains are given together with notes on the calculation of the length of a chain and the design of sprocket to run with a standard roller chain. Several tables of sprocket diameters for different pitches and numbers of teeth are included.

Elevating, Conveying and Power Transmission Machinery.—Jeffrey Mfg. Company, Columbus, Ohio. Catalogue No. 82. Size, 6 x 9 in.; pages, 576. Is a complete catalogue of the Jeffrey products and supersedes all previous editions. The various machines and appliances are shown for the most part in operation, and complete lists of dimensions and prices are included.

Regrinding Valves.—National Tube Company, Frick Building, Pittsburgh, Pa. Folder. Is arranged in the form of a catechism, the questions being the queries received most commonly. The globe, angle and check valves with a union bonnet are illustrated and instructions for regrinding are included.

Mercury Arc Rectifier.—General Electric Company, Schenectady, N. Y.—Bulletin No. 4925. Describes a combined unit series arc rectifier outfit mounted on a common base. These outfits are made for handling 25, 50 and 75 lights, and the arrangement makes the outfit, with the exception of the switchboard panel, a self-contained unit. Dimension and connection diagrams are included.

Turret Lathe.—International Machine Tool Company, West Twenty-first street and Belt Railway, Indianapolis, Ind. Booklet. Shows the size, shape and form of a few of the many pieces of work that have been machined on the Libby turret lathe, an illustrated description of which appeared in *The Iron Age*, April 27, 1911. Under the engraving of each piece appear its dimensions, the rate of production and the saving effected by the Libby lathe.

Melting Furnace.—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin No. 34. Describes a double chamber melting furnace for copper, brass, bronze, aluminum, ferro-silicon, ferromanganese, cyanide precipitate, etc., which uses either oil or gas as fuel. A number of illustrations of the furnace are included and a table of specifications for the three different sizes is given.

Mine Haulage Supplies.—Ohio Brass Company, Mansfield, Ohio. Catalogue No. 12. Size, 6 x 9 in.; pages, 487. Supersedes all previous catalogues and covers the complete line of appliances used in the construction, operation and maintenance of mine haulage systems. Mention is also made of the material used by electric railways and transmission lines.

Mangano-Silicon Steel.—Golden Steel Company, 456 Fourth avenue, New York City. Pamphlet. Concerned with a steel for leaf springs and contains a brief description of its treatment.

Fans.—B. F. Sturtevant Company, Hyde Park, Mass. Mailing card. Refers to the use of the Sturtevant propeller fans with either pulley or electric drive for keeping the air in offices and factories cool, pure and free from smoke, odors, steam and gases.

Motor Drive.—Ft. Wayne Electric Works of the General Electric Company, Ft. Wayne, Ind. Bulletin No. 1138, superseding No. 1111. Shows some of the many applications of motor drive to machines used in the various industries. No attempt has been made to include all the activities in which motor drives are now successfully used or to show all the applications in any particular industry, but at the same time the display is very complete. Among the various industries represented are the machine tool, the woodworking, the cement mill and the clay working. Electric cranes and hoists and motor-driven pumps and compressors are also shown. A brief description of the advantages of motor drive is included.

Reversing Switch.—J. B. Moore, 657 K street, N. E., Washington, D. C. Pamphlet. Gives directions for installing the Moore reversing switch for two-cycle gasoline engines, which was illustrated in *The Iron Age*, July 11, 1912.

Ventilated Motors.—Emerson Electric Mfg. Company, St. Louis, Mo. Bulletin No. 3221, replacing No. 3219. Concerned with a line of bipolar direct-current ventilated motors ranging from 1/20 to ¼ hp. The construction is described at length, and data tables and dimension diagrams are included.

Water Strainers.—Lagonda Mfg. Company, Springfield, Ohio. Pamphlet. Gives considerable practical information on the installation and operation of water strainers for power plant purposes and points out how a Lagonda type of strainer saves floor space in the engine room since large pits are not necessary, and the whole strainer can be buried under the floor with only the top and handwheel exposed. Other interesting and practical points are also brought out. *The Iron Age*, October 6, 1910, and September 14, 1911, contained illustrated descriptions of these strainers.

Gasoline Engines.—Deyo-Macey Engine Company, Binghamton, N. Y. Bulletin No. 200. Refers to the Deyo gasoline engine which is made in both stationary and portable types in sizes ranging from 1¼ to 16 hp. A brief description of the engine is given together with illustrations showing the various types of mountings.